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Original Articles

PRESIDENT'S ADDRESS

AMERICAN ASSOCIATION OF ORTHODONTISTS

CLAUDE R. WOOD, D.D.S., KNOXVILLE, TENN.

YOU have been extended a most cordial welcome by his Honor, the Governor of the State of Louisiana, and by his Honor, the Mayor of the City of New Orleans. I should feel lacking in hospitality if, to the guests, the membership of the American Association of Orthodontists and our Inter-American delegates, many of whom have traveled thousands of miles, I should fail to express my personal pleasure in their presence here today.

I address you in the most humble attitude, realizing full well that there are many in this audience who, because of their recognized ability and leadership, should be here in my place. Through a series of events and a chain of circumstances over the period of twelve years in which I have had the pleasure of serving the American Association of Orthodontists in an official capacity, I find myself ending my official duties in a position for which I am most grateful. It is, indeed, one of the greatest privileges of my life to address you as your presiding officer.

Because of war conditions we have curtailed all elaborate ceremonies and will confine ourselves for the most part to a close scientific study of the problems at hand. We have tried to arrange for you a program which will be of value to you in your practice.

We want to apologize for the fact that so few are listed as contributors from Central and South America. But world conditions have been of such changeable nature that we could not be assured of the consummation of the project until a

Read before a joint meeting of the Inter-American Orthodontic Congress and the American Association of Orthodontists at New Orleans, La., March 17, 1942.

very recent date, and because of the uncertainty of travel it was deemed advisable to have a preponderance of contributors residing in the United States. Fortunately, after the publication of the program, a few of our Inter-American delegates consented to participate in the discussions. I wish to extend a formal invitation to each of you to feel free at all times to take an active part in all of our deliberations. We also want you to feel at home and to enjoy our hospitality. I wish that we of this country could equal the famed hospitality which exists south of our border. I hope by our association that we may acquire from you some of the high ideals of chivalry which are characteristic of the Latin countries.

It is expected that the retiring official should give an account of the activities during his year as president and should make certain forecasts. One of the most notable events of the past year was the formation of what we like to term the first Inter-American Orthodontic Congress, the organization of which was authorized by the Board of Directors of the American Association of Orthodontists at its annual meeting in New York City in May, 1941. I quote as follows from the minutes of the Board:

> It was moved and approved that the Board of Directors recommend to the American Association of Orthodontists that the two Orthodontic Societies in Pan-America be invited to participate in a Pan-American Orthodontic Conference to be held in conjunction with the Annual Meeting of the Association in 1942, and that any fees in connection therewith be left to the discretion of the Inter-Relations Committee; that if the invitation is accepted, the Pan-American Societies appoint their own committee.

The following is an extract from the report of the Inter-Relations Committee:

> The President-Elect, Dr. Claude Wood, has suggested that the Government of the United States, through its Bureau of Cultural Relations, Department of State, is extremely desirous of promoting educational and cultural relations with South American countries, and that these Pan-American countries have a desire for more adequate knowledge and a closer orthodontic association. Therefore, we recommend that at our next meeting we invite societies and individuals representing orthodontic thought and practice to be our guests, and that this meeting be known as a Pan-American Meeting.
>
> Therefore the Inter-Relations Committee recommends for adoption the following resolutions:
>
> 1. That the 1942 meeting of the American Association of Orthodontists be a Pan-American meeting.
> 2. That Pan-American Societies and individuals be invited as guests of the American Association of Orthodontists.
> 3. That our committee be authorized to cooperate with the Bureau of Cultural Relations, Department of State, in making this meeting possible.
> 4. That the Board of Directors allocate a sum of money for the promotion and underwriting of this meeting.

It is also suggested that the place of meeting be selected advantageously for our guests from South America.

Respectfully submitted,

A. W. McClelland (Absent)
W. E. Flesher
John W. Ross, Chairman.

Upon communication with the Argentine and Mexican societies of Orthodontists, the two then existing Orthodontic societies in Central and South America, and with individuals in many of the Central and South American republics, we found them in unanimous accord as to the formation of an Inter-American Orthodontic Congress. Then a movement was started for the formation of committees in each of the twenty Inter-American republics. This consumed an enormous amount of time. Let me pause here to give due credit to two men who helped make this Congress possible: Dr. Armando Monti, President of the Argentine Society of Orthodontists, and Dr. Samuel Fastlicht, President of the Mexican Society of Orthodontists. Their assistance and cooperation was given at all times. It was largely through their efforts that we were able to appoint such a splendid committee in each of the Republics. We also wish to acknowledge the splendid cooperation and words of encouragement from Dr. Alfredo A. Morales of Guatemala and Dr. Louis De la Carrera of Chile. It has been my pleasure to have a most delightful correspondence with these gentlemen over a period of years. Their inspiring letters were gratefully received. More recently we have had the pleasure of corresponding with many of the other representatives, and in all instances we have found a most cooperative spirit.

We are happy to report that we have with us today representatives from the following Inter-American Republics: Argentina, Brazil, Bolivia, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Salvador, Uruguay, and Venezuela, as well as many representatives from the Dominion of Canada. No doubt this is one of the most widely representative gatherings of men interested in the science of orthodontics.

Speaking of worldwide meetings, let us recall the First International Orthodontic Congress, held in 1926, and pay tribute to the memory of Dr. William C. Fisher, who, no doubt, conceived the idea of orthodontics on an international basis. Then again, in 1931, the Second International Orthodontic Congress, held in London, proved a success through the leadership of Drs. Babcock, Nontcroft, Stevens, and Henry, of London. The Third Congress was to be held in Montreal, Canada, with Drs. Woodbury, McClellan, Fisk, and Franklin on the organizing committee. Time went on, but world conditions went backward. After a few years the Committee of the Third Congress decided it best to disband and reallocate the funds. At that time I was secretary-treasurer of the American Society of Orthodontists. While ordinarily every treasurer welcomes any refund, it was with little enthusiasm that I received this communication. It forecast that international orthodontics was on the decline. When the refund was presented to the Board, it was with the request that it

be earmarked as a separate unit from the general fund. Even then I was not convinced that orthodontics on an international basis was impossible. In the meantime, through correspondence necessary in the publication of the Orthodontic Directory, we found that an active Orthodontic Society had started in Argentina. This was followed by the Mexican Society of Orthodontists. This gave orthodontic societies to the southernmost country of South America and the northernmost country of Central America. In the meantime individuals of many other countries became more interested in the science of orthodontics. About four years ago Dr. Sergio Giquel of Havana, Cuba, suggested that we hold a meeting in Havana and include all Pan-Americans. Therefore, I wish to give Dr. Giquel credit for the original idea of an Inter-American Congress.

The Board of Directors of the American Association of Orthodontists, during the annual meeting in 1939, discussed the possibilities of a closer working orthodontic relationship between our neighbors to the south. The Educational Committee of the Association submitted a timely report in which they incorporated a set of resolutions offered by Dr. Harry Wright of Philadelphia. The secretary was instructed to forward the report with a suitable letter to all men interested in orthodontics in Central and South America. Our mailing list at that time was inadequate; however, we received many favorable replies from this communication, which showed that the men were deeply interested. During the years of 1940 and 1941 personal contact was maintained with these individuals by the secretary and later president-elect of the American Association. At the time of the 1941 meeting the president-elect made a report to the Board of Directors, outlining the progress which had been made toward the creation of a Pan-American Congress. After much discussion it was felt that the time was propitious to bring about the proposed Inter-American Congress. Thereupon the Board authorized the incoming president to proceed to organize such a Congress.

I have repeated the events in chronologic order to show that while the governments of our countries are now working for a united front in governmental affairs, the orthodontic profession of the Western Hemisphere has long recognized the need for an interchange of professional knowledge between the Americas. Scientific deliberations are conducive to a close welding of all people of all nations. National, as well as personal, differences are forgotten. It is our privilege here in the Americas to enjoy this freedom of thought. May God grant that we shall always have this privilege.

As we gather here today for scientific discussions as representatives of the orthodontic profession of the Western Hemisphere, let us consider these problems with a seriousness that befits our profession. There is no branch of the healing art that bestows more happiness on the affected individual than does our profession.

In the beginning orthodontists were concerned chiefly with aligning teeth. Now we are treating oral deformities which partially or wholly interfere with normal functions and health. Orthodontics is in reality the connecting link between dentistry and medicine. Starting with the obstetrician, the orthodontist should be able to discuss the necessary diet of the mother; next the pediatrician is one of his closest working companions during the entire time of

treatment as a consultant on the diet and general development of the child. He should be in close contact with the otolaryngologist in relation to affected tonsils and adenoids. The diagnostician is often consulted in regard to glandular disturbance. He is constantly in contact with the dentist. So in reality orthodontics is the connecting link between those two great exponents of the healing art. Are we cognizant of this fact, and do we take advantage of this opportunity to further the great benefits offered through orthodontic knowledge?

Have we been successful in teaching the dental profession the principles of prevention in orthodontics? Prevention is not in the province of the orthodontist, but almost wholly in that of the dental profession.

Orthodontists may be called upon to assume a new role in the present emergency. If so, we do not want the profession, or the individuals who engage in it, to be found lacking. True patriotism is never adequately expressed except by sacrifice. Patriotic speeches may or may not represent the true feeling of the speaker. Almost anyone can applaud or wave a flag; but genuine patriotism, like religion, is expressed, in the main, by sacrifice. The present emergency calls for such an expression of patriotism on the part of the dental profession.

Our Government knows that it can depend upon all groups and all professions to give first place to the common cause; second, to self. One of these, the dental profession, is especially deserving of trust on the strength of its past achievements, its present service, and its aspirations for the future. In war, as in peace, it serves humanity unselfishly, bringing to rich and poor the best knowledge of prevention and cure of disease that scientific research produces. There is no disputing the fact that a sacrifice is demanded. There is no way of minimizing the sacrifice. The present job is to recognize it as a sacrifice, to respect it, and applaud it as it should be respected and applauded, and to trust the future for the consequences.

As this meeting is one of international scope we are not going to dwell on matters of local concern, but there are a few projects of the American Association of Orthodontists that I think would be worthy of mention and would be of international interest. One of its greatest accomplishments in the past decade was the creation of the American Board of Orthodontics. I sincerely believe that its influence has been the source of more inspirational study than any other factor in the history of orthodontics in this country. To be certified by the American Board of Orthodontics is, indeed, a signal honor of which the recipient should be justly proud. It is an undertaking that the American Association of Orthodontists should be proud to claim as one of its projects. It should be continued whatever the cost may be to the Association.

The Public Relations Committee of the American Association of Orthodontists has been actively engaged in its educational work, reaching both the Health Services and the lay public for the past three years. You have received a transcribed report of its activities. The committee has worked diligently, and much credit should be given its members. Due consideration should be given to their request for a continuation of this project.

The American Association of Orthodontists wishes to acknowledge the magnanimous spirit of the Southern Society of Orthodontists in holding its an-

nual meeting at the time of the meeting of the American Association. The Southern Society abandoned its scientific program and will hold only a business session. We wish also to acknowledge its generous financial contributions.

The Association wishes to acknowledge that the Southwestern Society of Orthodontists postponed its annual meeting in deference to the American meeting. Such a spirit of cooperation is gratefully appreciated.

We have referred to the past; let us now turn to the future. I sincerely believe that much of the progress of orthodontics in the United States has been due to the influence of the orthodontic societies which have molded and guided the thoughts of the profession. It has been in these gatherings that new thoughts and theories have been tested. If progress has been made through local and national meetings, how much greater progress could be made in meetings of an international character such as we have today, where scientific men of many nations meet for an interchange of knowledge. We of the Americas should realize that the Western Hemisphere is the last outpost of free thought, and we should realize that now is the time to establish a more intimate and cordial relation, which will permit all members of the orthodontic and dental professions to know and esteem each other in their true worth and enable them to work together for the triumph of the ideals upheld by modern scientific knowledge. When we of North America realize the efforts and struggles which the professionals of Latin America have had to put forth in order to reach the place they occupy at the present in the scientific world, our respect and sympathy for those professionals south of us become even greater than it has been in the past. A greater understanding will result in benefit for all concerned.

It is my most fervent hope that this meeting will serve as an inspiration to all of those present and that it will stimulate orthodontic thoughts to the end that we shall soon have orthodontic societies in each of the twenty republics represented here today; also that this Congress may be followed by many others in the years to come. When we speak of Orthodontic Congresses, we do not mean those where discussion is limited to orthodontics to the exclusion of all other phases of dentistry, but we refer to meetings where orthodontic thought is the predominating factor. Conditions are such in many Central and South American countries that strict specializing is impossible.

I should like to make the following recommendations:

1. That the name of this meeting shall be the First Inter-American Orthodontic Congress.

2. That a Continuing Committee of the First Inter-American Orthodontic Congress be appointed to serve until the publication of the proceedings of the Congress has been consummated.

3. That the proceedings of the Congress be published in the three native languages of the Western Hemisphere: Spanish, Portuguese, and English, and that a copy be placed in each Dental School of Central America, South America, Mexico, and the West Indies.

4. (a) That during the time of this Congress there shall be called a meeting of all the representatives of all the countries present for the purpose of the formation of a Liaison Committee

whose duty it shall be to receive suggestions concerning the advisability of organizing a possible Second Inter-American Orthodontic Congress.

(b) That this Liaison Committee shall act as the organizing committee or shall have the power to appoint such a committee at its discretion for the advancement of a Second Inter-American Orthodontic Congress.

In closing allow me to express my most sincere appreciation for the splendid cooperation of the officers and the committees of the American Association of Orthodontists. I should like to commend especially the Program Committee, composed of Drs. Jones, Anderson, and Bell; the Inter-Relations Committee of Ross, Flesher, and McClellan; the Local Arrangements Committee of Broussard, Gore, Gorman, and Crozat; and the Reception Committee and its efficient Chairman, Dr. Jackson. The Secretary, Dr. Ernst, has been most cooperative at all times.

I wish to thank the essayists and clinicians who have given so unselfishly of their time and efforts. I also wish to acknowledge the cooperation of the President of the American Dental Association, Dr. Oren Oliver; also the splendid cooperation of the Chairman of the Pan-American Committee of the American Dental Association, Dr. Daniel Lynch.

The list of contributors to the success of this meeting would not be complete without the mention of the name of a man whose counsel and encouragement were always present. When the project seemed doomed to failure on many occasions, it was his strong words of encouragement that gave us the spirit to go on. I refer to Brig. Gen. Leigh C. Fairbank, Chief of the Dental Corps of the United States Army.

I also wish to thank the Department of State and the American Foreign Service for their interest in the Congress and their assistance in making arrangements for this group to be here today. Seldom, except for official governmental conferences, has an Inter-American meeting been held with representatives from every country in the hemisphere. This Congress is, therefore, a singular achievement in the relations of private professional organizations in the republics of the Americas.

FACIAL DEVELOPMENT IN HYPOPITUITARY DWARFISM*

M. B. Markus, D.D.S., S. D. Goosman, D.D.S., Nathan H. Einhorn, M.D., and Joseph Lerner, M.D., Philadelphia, Pa.

ATTENTION has been called in the literature to the relationship of facial growth and development to certain definable endocrine dyscrasias. For a proper evaluation of this relationship the true nature of the endocrine disturbance should be determined by utilizing all available means for establishing a proper diagnosis. Due allowance should be made for the effects upon development of malnutrition, systemic disorders, metabolic disturbances, and infections. When the endocrine disturbance has been definitely determined, some reliable method of appraising the development of the face should be employed.

In an effort to study this problem further, three groups of cases have been correlated: (1) pituitary dwarfism, (2) adiposogenital dystrophy, and (3) cretinism.

Two main groups of pituitary dwarfs are recognized ordinarily. The first group shows a deficiency of all the hormones of the anterior lobe resulting in general retardation of growth, intelligence, sexual development, and hypofunction of the entire glandular system. In the second group there is primarily a deficiency in the growth-controlling hormone resulting in retarded growth in an individual who is otherwise normally developed. No attempt has been made to make such a differentiation in this series because designating these cases by any diagnosis other than that of pituitary dwarfism would confuse rather than clarify the problem.

METHOD OF PROCEDURE

The patients described in this presentation were selected with great care from a large group showing various types of derangement of growth and development. Two criteria were fulfilled by the patients selected, i.e., (1) diminutive size of the body, and (2) retarded development of both primary and secondary sexual characteristics.

Usually a complete history and physical examination were sufficient to eliminate those patients whose retarded development was due to intestinal or metabolic derangements, congenital heart disease, achondroplasia, renal rickets, etc. Instances of dwarfism due to infections were eliminated by means of blood counts, urinalysis, tuberculin tests or chest roentgen studies, or both when indicated, and Kahn reactions; stool examinations to determine the presence of ova and parasites were also made. Other examinations consisted of basal metabolic determinations, cholesterol and blood sugar levels. Roentgen examina-

*From the Philadelphia Institute of Medical Research, Dr. Leonard G. Rowntree, Director, and The Pennhurst State School, Spring City, Pa.
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Read before the New York Society of Orthodontists, Nov. 11, 1941.

tions were made of the centers of ossification in the wrist and ankle joints. The head was studied similarly in order to determine the presence of abnormalities in the sella turcica and in the bones of the skull.

In so far as retarded growth was concerned, the following features were sought for: relatively large head as compared to the trunk and extremities, small thin bones, late appearance of centers of ossification, delayed fusion of epiphyseal lines, small body measurements maintaining infantile proportions, discrepancy in measurements characteristic of pituitary disease, i.e., upper measurements greater than lower and span shorter than height. The retarded sexual development was characterized by deficient development of primary and secondary sex characteristics, by small external genitals, sparse beard, axillary and pubic hair, overdeveloped breasts, and rounded body contours in the males; and in the females small vagina, infantile uterus, undersized breasts, scant pubic hair, and absent or late menstruation.

By means of these studies it was possible to select eight patients in whom all the criteria necessary for establishing a diagnosis of pituitary dwarfism were fulfilled. Having established this clinical diagnosis, these patients were studied from the point of view of their facial development.

CASE REPORTS (SEE TABLE I)

CASE 1: S. K., female, aged 15 years 5 months, was referred to the clinic for treatment of retarded growth and development. She was an only child; no members in her family suffered from endocrine disorder. As a child, she had measles, chicken pox, and mumps, recovering without complications or sequelae. Tonsils and adenoids were removed at the age of 6. Menstruation had not appeared, and the patient was an obvious dwarf. Examination of the school record revealed that she had grown from 40.5 inches in 1932 to 49 inches in 1939, a total of 8.5 inches in seven years. Facial appearance suggested mild progeria. There was no axillary or pubic hair; a small amount of down was noted on the extremities; breasts were poorly developed and external genitalia small. Eye grounds and visual fields were normal. Roentgen study showed the following: centers of ossification and epiphyses small for a child of this age; delay in ossification of epiphyses, epiphyseal lines wider than usual; no thinning of bones of the skull, sella turcica normal in size; no evidence of erosion or destruction of clinoids.

Measurements were as follows: weight 62 pounds, height 48.5 inches, vertex of head to pubis 24.5 inches, pubis to floor 24 inches, span 46 inches.

Special Tests: Tuberculin test negative. Stool negative for ova and parasites. Kahn reaction, blood and urine examinations negative, cholesterol 165, basal metabolic rate plus 20.

CASE 2: I. L., male, aged 7 years 5 months, was referred for treatment of retarded growth. No members of his family suffered from endocrine disorder. He was a seven-month premature infant, birth weight 2.75 pounds. At the age of 1 year, he weighed 12 pounds. Dentition, talking, and walking had been retarded. Diet throughout infancy was managed well, although patient ate poorly. Aside from measles, and a tonsillectomy, nothing of further note was discovered

TABLE I

DATA ON EIGHT CASES OF PITUITARY DWARFISM

PATIENT	AGE	SEX	WEIGHT	HEIGHT	VERTEX PUBIS	PUBIS FLOOR	SPAN	KAHN TEST	METAB.	CHOL.	T.B.	STOOL	BLOOD	URINE
S. K.	15.5	F	62	48.5	24.5	24	46	Neg.	+20	165	Neg.	Neg.	N	Neg.
I. L.	7.5	M	35	42.5	20	22.5	39	Neg.	+ 3	198	Neg.	Neg.	N	Neg.
A. Z.	16.2	F	84.5	53.75	27.5	26	51	Neg.	+31	210	Neg.	Neg.	N	Neg.
A. U.	10.0	M	40	43.5	21.5	22	43.5	Neg.	-	195	Neg.	Neg.	N	Neg.
J. M.	16.6	M	96.5	58.75	29	29.5	58	Neg.	-11	198	Pos.	Neg.	N	Neg.
A. S.	19.5	F	78.5	57	23	24	56	Neg.	+15	190	Neg.	Neg.	RBC 2.5 m. Hg 40%	Neg.
A. B.	21.2	M	67	56	27	29	56	Neg.	-	260	-	-	N	Neg.
H. S.	13.1	M	68	52	26	26	51	Neg.	-	235	-	-	N	Neg.

in his past history. Marked dental caries was present causing an early loss of the deciduous molars. Eye grounds and visual fields were normal. Aside from the obviously retarded growth, nothing else of note was observed. The roentgen study of centers of ossification in wrist and ankle revealed no apparent deficiency in either development or texture of bones of wrists or ankles although small for a child of this age; their respective epiphyses appeared normal; lung fields and cardiac silhouette were negative; sella turcica was normal in size and shape, and there was no evidence of erosion or destruction.

Measurements were as follows: weight 35 pounds, height 42.5 inches, vertex of head to pubis 20 inches, pubis to floor 22.5 inches, span 39 inches.

Special Tests: Tuberculin tests negative. Repeated stool examinations negative for ova and parasites. Kahn reaction, blood and urine examinations negative. Cholesterol 198, basal metabolic rate plus 3.

Case 3: A. Z., female, aged 16 years 2 months, was seen because of retarded growth and development. At the age of 4, both parents died following an accident, and the child was brought up in an orphanage. As a child, she had measles, chicken pox, mumps, and pertussis, recovering from these without complications or sequelae, and at the age of 7, tonsils and adenoids were removed. She was in the second year of high school, her scholastic work being above average. Menstruation had not occurred. Aside from an inferiority complex because of the shortness of stature and poor development, nothing unusual was noted in behavior or reactions. The patient was obviously shorter than normal. Facial appearance suggested progeria. There was no axillary hair, although a slight amount of pubic down and sparse hairiness over extremities was present. Breast development was absent; external genitalia resembled those of a small girl. Eye grounds and visual fields were normal. Aside from these findings, nothing of importance was observed in the physical examination. Roentgen examination of centers of ossification in wrist and ankle revealed definite delay in ossification of epiphyses. Centers of ossification and epiphyses were small for a child of this age. There was underdevelopment of long bones, no abnormality of skull or sella turcica.

Measurements were as follows: weight 84.5 pounds, height 53.75 inches, vertex of head to pubis 27.5 inches, pubis to floor 26 inches, span 51 inches.

Special Tests: Tuberculin test negative. Repeated stool examinations negative for ova and parasites. Kahn reaction, blood and urine examinations negative. Cholesterol 210, basal metabolic rate plus 31.

Case 4: A. U., male, aged 10, was seen because of retarded growth and backwardness. No other members of family suffered from endocrine disturbances. He was born at term, no birth injuries, birth weight 5.75 pounds. He walked at 19 months and talked at 3 years. Bilateral suppurative otitis media followed by bronchopneumonia occurred at 6 months, measles followed by bronchopneumonia at 3 years, chicken pox at 4 years; tonsils and adenoids were removed at 3 years. He always had a poor appetite, and ate only because he was forced to do so by a solicitous mother. At the age of 5, he entered kindergarten but was sent home after one month because he required too much attention from

the teacher. At the age of 6, he entered the first grade, but the parents were advised to take him out of school because the teacher felt that he was not responsive. General nutrition was fair. The features were small but proportional. External genitals were the size of those seen in a boy one or two years of age. Eye grounds were normal. Roentgen examination revealed the presence of only two carpal bones in the hand, marked underdevelopment of bones of hand, lower leg, and ankle, increased convolutional markings of skull, slight widening of suture lines; normal cardiac silhouette and increased peribronchial markings in lungs.

Measurements were as follows: weight 40 pounds, height 43.5 inches, vertex of head to pubis 21.5 inches, pubis to floor 22 inches, span 43.5 inches.

Special Tests: Tuberculin tests negative. Repeated stool examinations negative for ova and parasites. Kahn reaction, blood and urine examinations negative. Cholesterol 195.

Case 5: J. M., male, aged 16 years 6 months, was seen because of retarded growth and sexual development. He had two normal brothers. There were no instances of similar retardation in other members of the family. The patient weighed 5.5 pounds at birth. He had measles at 4 years, chicken pox at 6 years, mumps and bilaterial cervical adenitis at 10. Tonsils and adenoids had been removed at the age of 5. His school work was excellent. His face suggested progeria. Although shorter than average for boys of his age, his features seemed proportional. There was a slight amount of facial and pubic down, but no axillary hair was present. The external genitalia were small, the phallus measured 2 by 1 cm., and the testes about 1 cm. in diameter. Eye grounds and visual fields were normal. Roentgen studies revealed delay in ossification of epiphyses, epiphyseal lines wider than usual for this age, metacarpals short, general underdevelopment of long bones, ossification centers and epiphyses small; skull large with slight thinning of bones, sella turcica normal in size and shape, no evidence of erosion or destruction of clinoids; peribronchial markings increased, and cardiac silhouette normal.

Measurements were as follows: weight 96.5 pounds, height 58.75 inches, vertex of head to pubis 29 inches, pubis to floor 29.5 inches, span 58 inches.

Special Tests: Tuberculin test positive. Urinalyses and blood counts revealed no gross abnormalities. Kahn reaction negative, cholesterol 198, basal metabolic rate minus 11.

Case 6: A. S., female, aged 19 years 5 months, was referred from another hospital for treatment of retarded growth and development. No history of other instances of endocrine disorder in family. She had measles, chicken pox, mumps earlier in childhood and had always been susceptible to upper respiratory infections. Tonsils and adenoids were removed at 6 years of age. Her school work was below normal, not because of inferior mentality, but because she had been out of school repeatedly due to parental negligence. Menstruation had not occurred. The patient was retarded obviously in both growth and development. Neither axillary nor pubic hair was present. The breasts and external genitalia were infantile. Eye grounds and visual fields were normal. Roentgen ray

studies revealed a normal number of ossification centers in wrists, centers of ossification as well as long bones small, rate of ossification retarded, carpals and tarsals small; bones of skull normal, no evidence of increased intracranial pressure, sella turcica small, no erosion or destruction of clinoids; lung fields clear, heart not enlarged.

Measurements were as follows: weight 78.5 pounds, height 57 inches, vertex of head to pubis 23 inches, pubis to floor 24 inches, span 56 inches.

Special Tests: Tuberculin negative. Repeated stool examinations negative for ova and parasites. Kahn reaction negative, urine normal, blood count 2.5 m. erythrocytes, hemoglobin 40 per cent, hypopituitary glucose tolerance curve, basal metabolic rate plus 15, cholesterol 190.

Case 7: A. B., male, aged 21 years 2 months, because of idiocy was an inmate at the Pennhurst Training School. His father was an inmate of a state psychopathic institution. Aside from this, nothing of note was discovered in family history. At the age of 5, he had chicken pox and measles. Eruption of teeth began at 12 months, walking at 2 years, and the use of single words at the age of 5. The patient showed obvious retardation in growth, mental and sexual development. A small amount of hair was noted on the arms and legs and pubis, but there was no hair in the axillae. Penis measured 4 by 1.5 cm., testes 1 cm. in diameter. Muscular development and tissue tone were good. Eye grounds were normal. Roentgen examination of centers of ossification in wrists and ankles revealed the normal number, epiphyseal lines distinct, incomplete fusion of centers with shafts of bones; skull normal, considerable flattening in the occipitoparietal region, anterior fossa shallow, small sella turcica but within normal limits of size and shape.

Measurements were as follows: weight 67 pounds, height 56 inches, vertex of head to pubis 27 inches, pubis to floor 29 inches, span 56 inches.

Special Tests: Blood and urine examinations revealed no abnormal findings. Cholesterol 260, Kahn reaction negative.

Case 8: H. S., male, aged 13 years 1 month, was an inmate of the Pennhurst Training School, diagnosis high grade moron. Family history revealed nothing of note. He walked at 15 months, and talked at 3 years. He was always small for his age. At 6 years, he entered school, but because he was difficult to control and unresponsive, institutional care was recommended. He had pertussis at 2 years, scarlet fever and measles at 5, and a tonsillectomy at 10 years. Retardation in growth, mental and sexual development was obvious. Intelligence quotient was 50. A moderate amount of hair was present on the arms and legs, a small amount of down was present on the face, pubis, and in the axillae. Penis measured 5 by 1.5 cm., testes 1 cm. in diameter. Eye grounds were normal. Roentgen studies revealed the following: tarsals and carpals small but normal in number; skull small, bones normal, sella turcica small but within normal limits of size, anterior and posterior clinoids fused.

Measurements were as follows: weight 68 pounds, height 52 inches, vertex of head to pubis 26 inches, pubis to floor 26 inches, span 51 inches.

Special Tests: Blood and urine examinations negative. Kahn reaction negative, cholesterol 235.

FACIAL DEVELOPMENT

For the appraisal of the growth and development of the face, anthropologic measurements of its height, width, and depth were made of each patient by means of the spreading and sliding calipers and the Todd Head Spanner according to the procedure devised and employed by Hellman.

This entailed making a graph or linear composite of the age, height, weight, and facial measurements for each patient. This linear composite or "wiggle," the term used by Hellman, was superposed upon a frame or standard which assumes the form of a symmetric polygon. The midline of this polygon represents the average and its margins represent the Standard Deviation calculated for each measurement so that any measurement falling within these margins is considered to be within the normal range. Those features which are less than the average are placed to the left or minus side and those that are greater than the average are placed to the right or plus side of the center line. Any measurement falling outside of the margins is beyond the range of the Standard Deviation and is considered abnormal.

The eruption of the teeth is employed by Hellman as the unit for the measurement of time instead of the chronologic age of the patient. For this reason he has devised definite dental stages which are characterized by the eruption of certain teeth. Individual polygons or standards must, therefore, be employed for each stage of dental development, not chronologic age, and also for each sex.

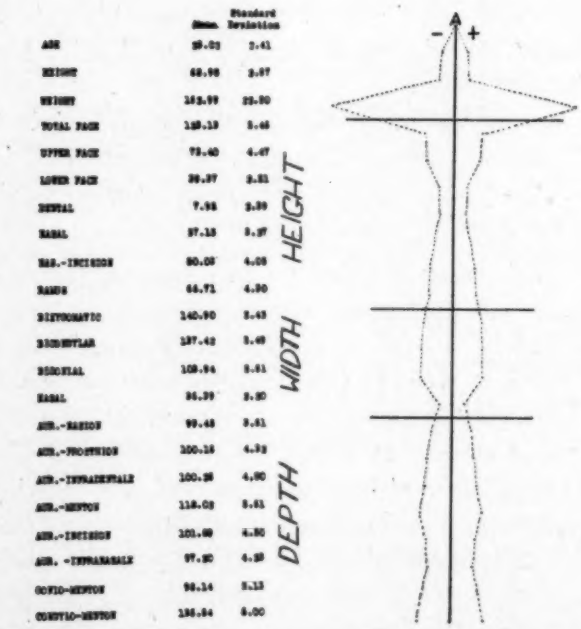


Fig. 1.—Tabulation of features of sixty-two young adult males with dentitions in normal occlusion, showing averages (means) and standard deviations of their dimensions, and the polygon derived which is used as the normal standard. (From Hellman.)

Fig. 1, taken from Hellman, is a symmetric polygon constructed from the calculations shown opposite each measurement. These measurements were obtained from a series of sixty-two males, stage V A, with dentitions in normal occlusion.

Fig. 2, taken from Hellman, shows the wiggles constructed for three individuals, males, stage V A, with dentitions in normal occlusion. All features of each individual are within the normal range, but as shown by the individual wiggle they vary from each other.

Following this technique and using the measurements and calculations (Averages and Standard Deviations) by Hellman, a standard polygon was constructed for each corresponding stage of dental development of the eight cases of hypopituitarism. On each standard was superposed the measurements of the individual cases creating the wiggle.

Fig. 3 shows the wiggle constructed from the measurements taken of patient S. K. and superposed upon the standard for stage IV A, female obtained from Hellman's measurements. This shows extreme underdevelopment in height and weight, and underdevelopment in height of the face and a decided underdevelopment in its width and in the depth of the lower face or mandibular depth.

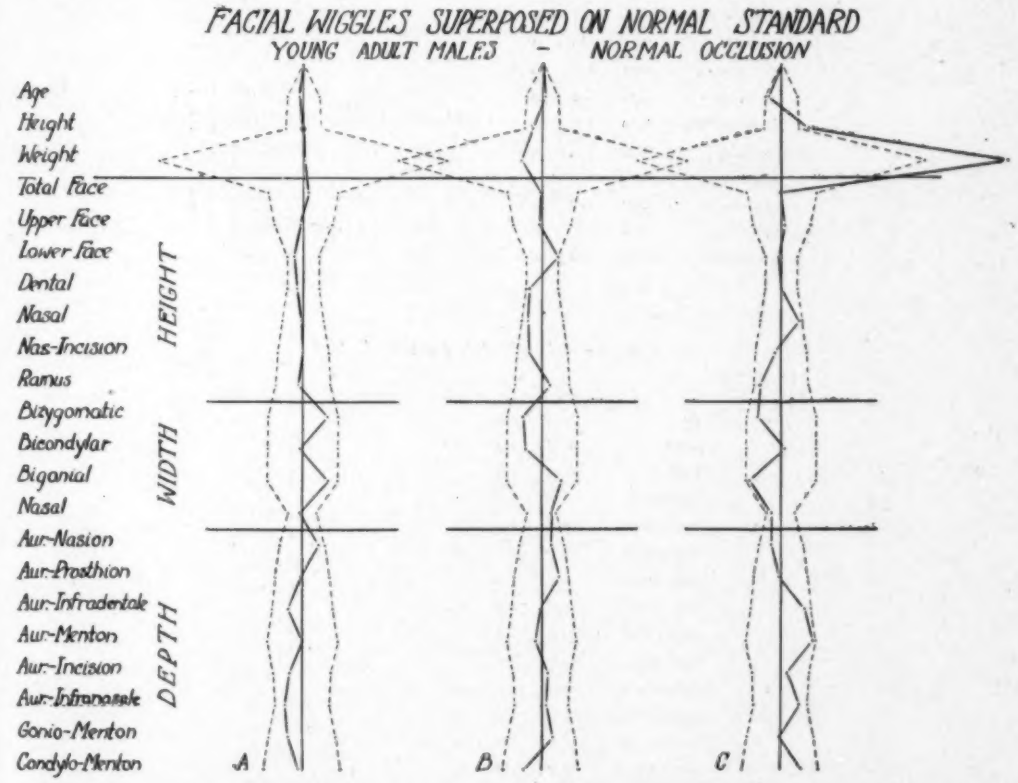


Fig. 2.—Wiggles of facial features of three individuals with dentitions in normal occlusion, showing no deviations outside the normal limits. (From Hellman.)

Fig. 4 is the wiggle for patient I. L., and it is superposed upon the standard for stage II C, male. This shows body underdevelopment especially in weight, underdevelopment in ramus height, and decided underdevelopment of the width and depth of the face, especially in depth of the lower face.

Fig. 5 is the wiggle for patient A. Z. and is superposed upon the standard for dental stage IV A, female. This patient also exhibits extreme body underdevelopment especially in weight, but the facial development falls within the normal range except for the depth of the lower face. Although the measure-

ments fall within the normal range they are all on the minus side of the average showing a tendency toward retardation.

Fig. 6 is the wiggle constructed for patient A. U. and is superposed upon the standard for stage III A, male. There is marked body underdevelopment espe-

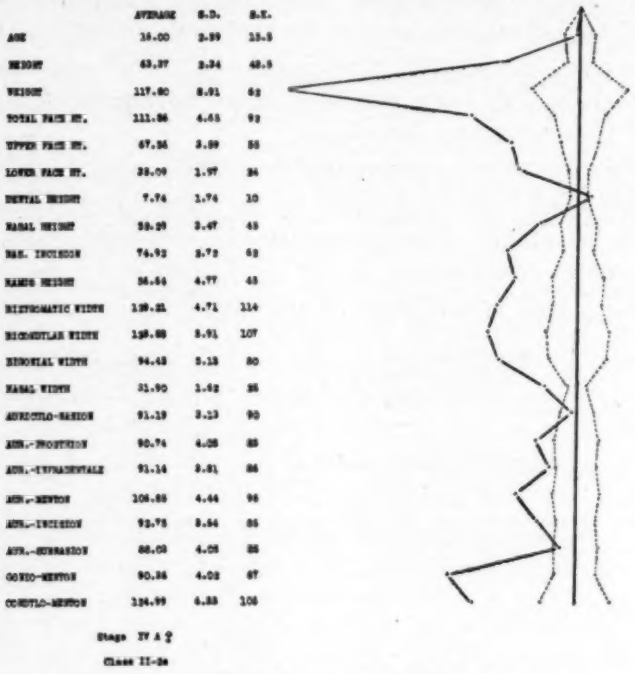
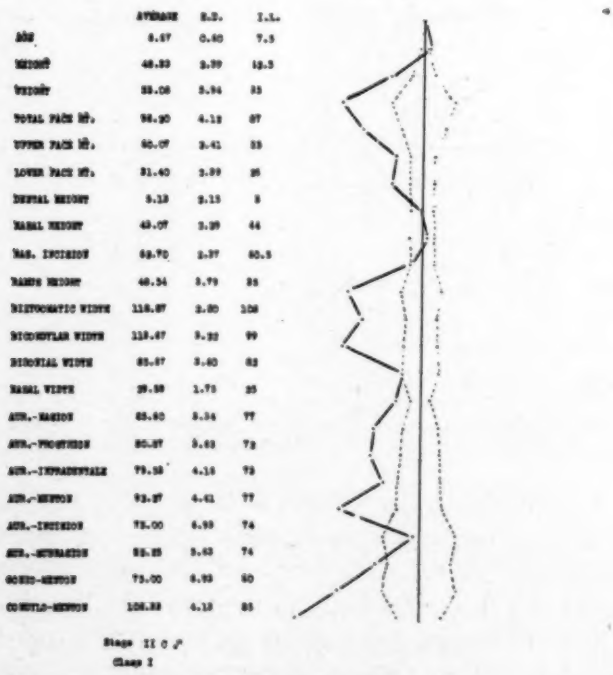


Fig. 3.—Wiggle for patient S. K.*



F.g. 4.—Wiggle for patient I. L.*

*The figures for the average were compiled by Hellman from a large group of the same dentition stage. The S. D. is Standard Deviation of the average. Age is expressed in years, height in inches, weight in pounds, and facial measurements in millimeters.

cially in weight and also marked facial underdevelopment in height, width, and depth of face, especially in depth of the lower face.

Fig. 7 is the wiggle for the patient J. M., and it is superposed upon the standard for stage IV A, male. The height and weight fall just on the edge of the standard deviation which would indicate a mild form of hypopituitarism.

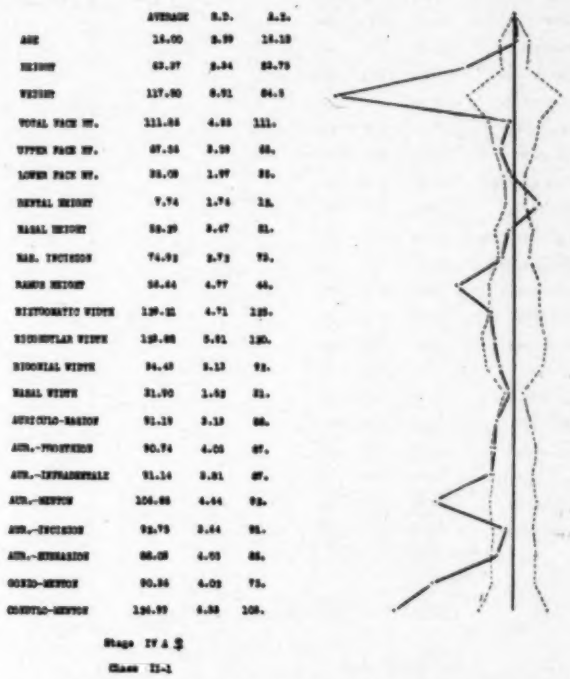


Fig. 5.—Wiggle for patient A. Z.*

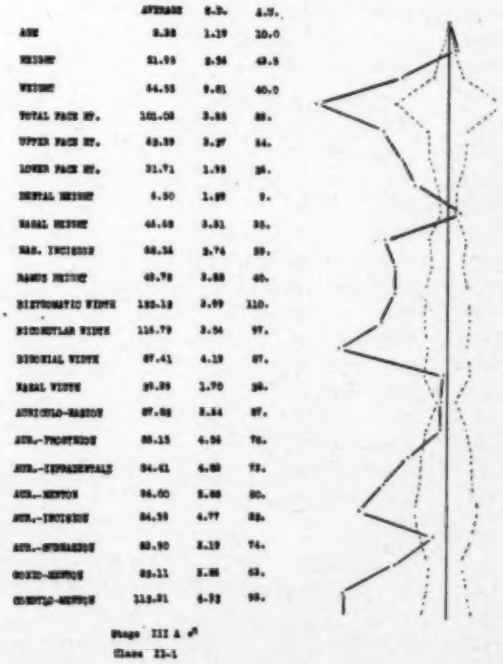


Fig. 6.—Wiggle for patient A. U.*

There is an underdevelopment in the height of the lower face, in ramus height, in bigonial width, and in the depth of the lower face. The other facial measurements fall within the normal range, indicating a rather mild underdevelopment of the face.

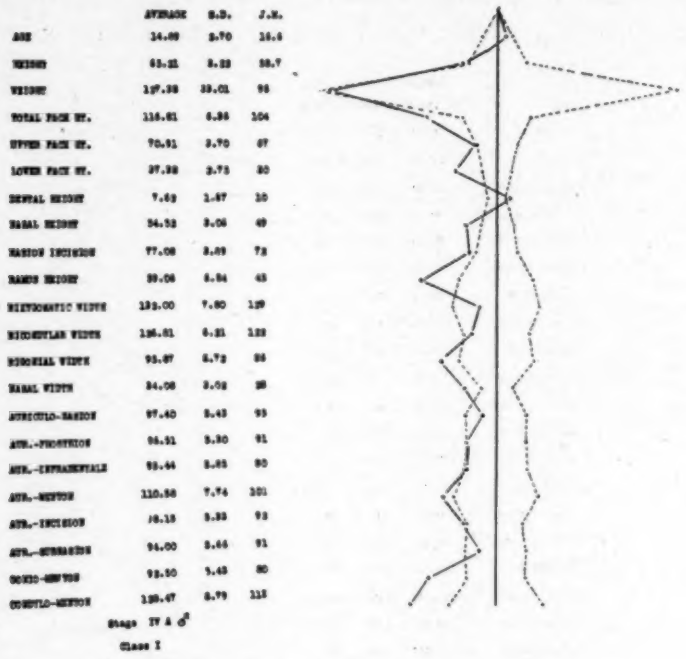
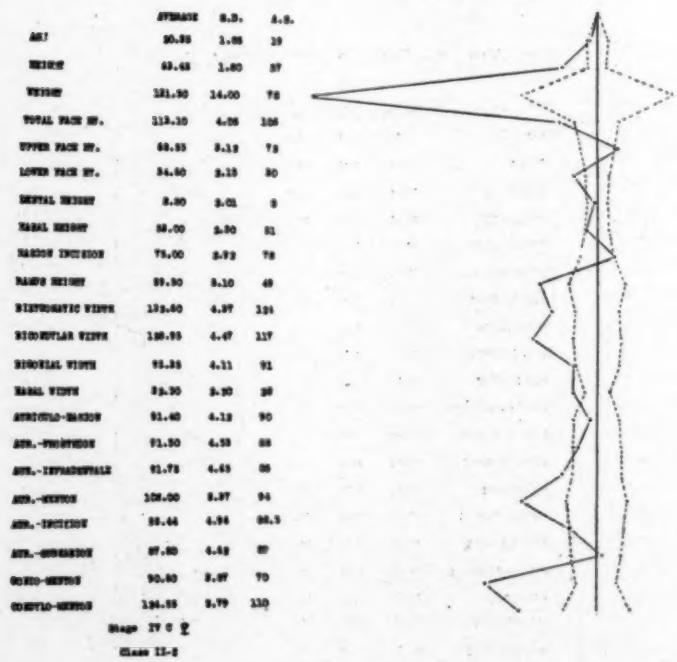


Fig. 7.—Wiggle for patient J. M.*



F.g. 8.—Wiggle for patient A. S.*

Fig. 8 is the wiggle of patient A. S., and it is superposed upon the standard for stage IV C, female. There is marked body underdevelopment especially

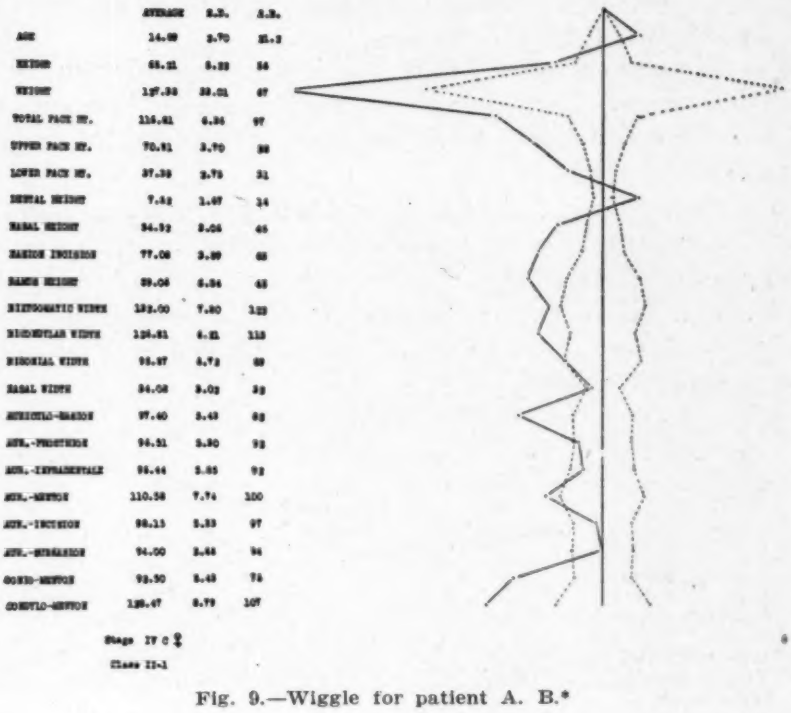


Fig. 9.—Wiggle for patient A. B.*

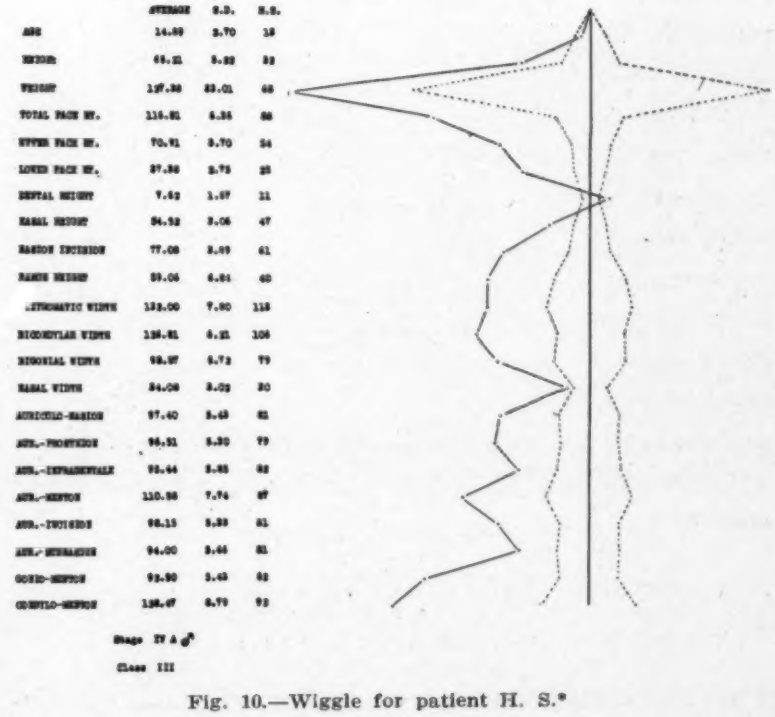


Fig. 10.—Wiggle for patient H. S.*

in weight and an underdevelopment of the height of the lower face, the width of the face, and a decided underdevelopment of the depth of the lower face with the upper facial height above the average.

Fig. 9 is the wiggle of patient A. B., and it is superposed upon the standard for stage IV A, male. There is marked body underdevelopment, especially in weight and the entire face is underdeveloped, with a decided underdevelopment in the depth of the face.

Fig. 10 is the wiggle of patient H. S., and it is superposed upon the standard for stage IV A, male. There is marked body underdevelopment especially in weight and a very decided underdevelopment of the face in height, width, and depth, especially in depth of the lower face. It is interesting to note that despite the fact that the lower face is markedly underdeveloped in depth, a Class III case of malocclusion is present.

Fig. 11.—Eight wiggles superposed upon common average line.

Fig. 11 shows the wiggles of each one of the eight cases represented in this manner for the purpose of comparison. It is evident that all cases show a body underdevelopment especially in weight and a general underdevelopment of the face particularly in width and depth, and a decided underdevelopment of the

depth of the lower face, or mandible. It is interesting to note that dental height falls within the standard deviation and on the plus side of the average. This would indicate that eruption of teeth seems to proceed along normal lines. There seems to be a tendency toward a similar pattern of facial development in all of the cases described. Figs. 12, 13, and 14 show front and profile facial photographs of three of the patients.

Fig. 12.—Facial photographs of patient S. K.

Fig. 13.—Facial photographs of patient I. L.

Dental radiographs and casts were recorded for all of the patients. Table II is a chart showing the occlusion of the teeth in each case. It also shows a comparison of the ages of the patients with their dental stages. In addition, these are further compared with Hellman's group which is used as a standard for appraisal.

As far as the eruption of the teeth is concerned, it is evident from the above chart that there is no retardation present as evidenced by the fact that in most

TABLE II

COMPILATION OF INDIVIDUAL CASES SHOWING COMPARISONS IN AGE, DENTITION STAGE, AND OCCLUSION

PITUITARY DWARFISM					AVERAGE*	
PATIENT	SEX	OCCLUSION	DENTAL STAGE	AGE	AGE	S.D.
S. K.	F	II-2 s	IV A	15.5	14.89	2.16
I. L.	M	I	II C	7.5	7.69	1.94
A. Z.	F	II-1	IV A	16.2	14.89	2.16
A. U.	M	II-1	III A	10.0	9.00	1.41
J. M.	M	I	IV A	16.6	14.78	2.07
A. S.	F	II-2	IV C	19.5	20.05	2.28
A. B.	M	II-1	IV A	21.2	14.78	2.07
H. S.	M	III	IV A	13.1	14.78	2.07

*Hellman, Milo, "An Introduction to Growth of the Human Face from Infancy to Adulthood"; INTERNATIONAL JOURNAL OF ORTHODONTIA, 1932.

instances the age at which the dental stage occurs in the hypopituitary cases is within the range of normal variation.

With regard to the occlusion of the teeth of the patients described in this presentation, the above chart shows that two Class I cases, three Class II, Division 1 cases, one Class II, Division 2 case, one Class II, Division 2, subdivision, and one Class III case were present. From this observation it is apparent that malocclusion occurred in all of the eight cases of hypopituitary dysfunction and that all classes of malocclusion were present. Therefore, it can be stated that no particular type of malocclusion was associated with these reported cases of pituitary dwarfism.

Fig. 14.—Facial photographs of patient A. Z.

A study of the dental radiographs revealed that the outlines of the pulp chambers and root canals were wide and that the roots were lagging behind in completely calcifying. This again indicates that there is retardation in development. This observation was also noted in a paper by Schour and Brodie, published in the October, 1934, issue of the *Angle Orthodontist,* entitled the "Hypophysis and the Teeth," in which animal findings and the observations on

one human case of hypopituitary disturbance were described. Figs. 15, 16, and 17 show x-rays of three of the cases as indicated.

Fig. 15.—Radiographs of patient J. M.

Fig. 16.—Radiographs of patient A. B.

In summarizing the observations made in this study the following points are of interest:

1. A thorough medical and laboratory appraisal is essential in a study of retarded growth and development. Without such it is impossible to differentiate

cases due to hypopituitarism from those due to dyscrasias of other glands or systemic or metabolic disorders.

2. To appraise the development of the face and dentition, the method of relating the chronologic age of the patient to their stage of dental development, as employed by Hellman, was used.

3. The growth and development of the face were found to be definitely retarded, but more particularly in width, and more especially in depth of the lower face (mandibular depth). The persistent retardation in lower depth (mandibular depth) demonstrates a tendency toward similarity in pattern of facial development.

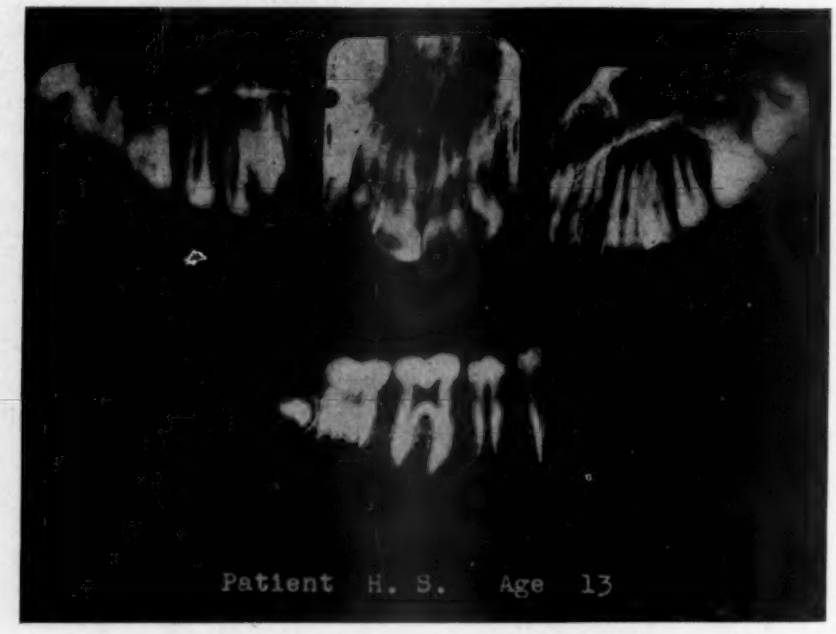


Fig. 17.—Radiographs of patient H. S.

4. All classes of malocclusion existed in the patients reported in this study suggesting caution in attempting to correlate definite types of malocclusion with hypopituitarism.

The authors wish to express their gratitude and appreciation to Dr. Milo Hellman for his suggestions and assistance in the preparation of this study.

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Central Medical Bldg., Philadelphia, Pa.

THE ATKINSON APPLIANCE

RICHARD A. LOWY, D.D.S., NEWARK, N. J.

TWO years ago it was my good fortune and Dr. Ralph Waldron's misfortune, because of his eye condition, to read his paper "A Résumé of Dr. Spencer R. Atkinson's Findings in the Study of Malocclusion and a Technique Applicable to the Strategy Common for the Treatment of Mass and Regional Malocclusion." Because of that incident, that summer I attended the Fourth Annual Conference at the University of Southern California.

Therefore this paper is, shall we say, a "Reader's Digest Article" of the Atkinson universal appliance and its philosophy plus some personal reactions.

May I also express my sincere thanks to Dr. Atkinson and Dr. Waldron for their aid in the preparation of this paper.

The study of orthodontics can be said to be divided into two distinct phases, biological and mechanical. The line of demarcation is barely perceptible making it imperative for a successful practitioner to have a thorough understanding of both. Orthodontics as a science must progress if it wishes to remain with the sciences. However, in the development of any science changes, slow or radical, take place. Careful study must be given to these changes. So-called "snap judgment" is not in good order. Naturally, controversies arise for and against the acceptance of new ideas. We must carefully appraise, and then accept or reject these new ideas. But without study we have no right to reject or dismiss them with destructive criticism.

You may well wonder why I start my discussion in the above manner. It definitely is not in the form of an apology, but past experience has taught me the necessity of careful presentation of new ideas.

At all times we must not become pseudo scientists. We should realize that most of us are practical orthodontists. It is fine to theorize, but always remember that when making a public statement it must be backed up by more than, "That is my belief."

Let us take a broad picture of our problem and reiterate some of the broad truths.

When a malocclusion exists, there are probably other disturbing factors present. We should also remember that the human tooth, once formed and calcified, can never change its shape. The plane of development, size, shape, and axial position is all predetermined in harmony with the architecture of the skull. Deviation from any of the above-mentioned results in disharmony of the dental arches.

The supporting bone structure of the teeth is dependent upon the function expected. The health of the bone is in direct relation to the stress placed upon it. When a tooth or teeth are in malocclusion, the damage to the bone is in proportion to the trauma, resulting from the distorted stress.

Read before the New York Society of Orthodontists on Nov. 11, 1941.

The bone between the lingual and buccal cortical plate is cancellous bone. The bone between each tooth or interproximal bone consists of a bridge of denser bone. As it approaches the apex of the tooth, it becomes more and more cancellous.

It is a truism to say, "Seeing is commonplace but observing is the unusual." The lack of observation of any definite etiologic factor may result in a failure. In passing let us spend a few minutes on that subject. It is not the essayist's intention to bore you or insult your intelligence in discussing some of the common vicious habits. But they are more or less linked up with a newer and more efficient conception of treatment.

If we can visualize the muscle of the upper and lower lips as chin caps, we realize that they restrain too great a forward movement of teeth. But weak muscles will permit faulty movement of teeth. Conversely, if the pressure is too great and persistent, teeth and bone can be moved. In fact, muscles always win over bone. The habits which may affect occlusion are many and varied. Improper swallowing habits cause perverted muscle movement and may result in an open-bite.

The mouth-breather affects the balance of atmospheric and muscle pressure.

The sleeping and leaning habits are most vicious. The amount of malocclusion due to extraneous force is claimed to be in direct ratio to the softness of the supporting bone. Thus, improper sleeping habits, such as sleeping on the hand or by placing most of the weight on the face, result in malocclusion. Incidentally, this can be observed by noting the posture of the patient. His head usually leans in the direction of the pressure. Also, one nostril may be larger than the other.

The habit of resting the face in the hand results in an unwanted result.

The thumb or finger habit needs no discussion.

Unfortunately, the pressure exerted upon the bones of the face seems so trivial that it is often ignored because the changes to the structure are slow and painless.

One must remember that a successful retention of an orthodontic case is often dependent upon the complete elimination of vicious habits.

Whatever nomenclature is used for the classification of anomalies is not the all-essential to proper orthodontic treatment. Whether one uses the Angle classification or Simon's is of no great consequence. But one should know the correct positioning of the individual teeth, thus determining what should be moved and in what direction.

One diagnostic aid that is often used is the position of the maxillary first molar. Since that tooth receives the greatest force of stress in mastication, nature has provided a re-enforcement of bone in that area. It is a strong buttress of bone which descends downward and forward from the zygoma to the maxillary bone. In the adult the ridge should lie directly over the mesiobuccal root of the maxillary first molar. Whereas, at the age of 3, the second deciduous molar should be under the ridge and the first permanent molar consequently moves forward with growth until it assumes its correct position under the ridge. With this factor in mind we should realize that the bone anterior to the ridge is neither

wide enough nor strong enough to successfully carry the first permanent molar. Further, if we visualize the supporting bone structure in relation to the individual teeth, we would see that cancellous bone from the anterior teeth to the molar widens progressively in order to accommodate the increasingly larger teeth. This very fact is of utmost importance in orthodontic treatment and will be elaborated upon a little later.

In describing Dr. Spencer Atkinson's universal appliance, one must first state that neither he nor his co-workers at the University of Southern California claim that it is the panacea of all appliances. Nor do they claim that it should replace all other types of orthodontic mechanism. However, one can see many of its advantages, plus its adaptability to other types of appliances.

The appliance is best described as a lingual and labial type of appliance.

The lingual arch is used basically as the stabilizing force on the molar teeth. It is a piece of .030 chrome alloy wire. It is inserted into a lingual sheath horizontal to the occlusion surface, thus eliminating the vertical post. This permits the distal movement of the molar which is often prevented when a vertical post is used. Bodily expansion is also obtainable with its use.

The labial appliance necessitates the use of the universal bracket. This attachment is welded on to the bands and contains two transverse slots. The gingival one opens buccally into which may be fitted round .008, .010, .012, .015 tempered chrome wires. Whereas the incisal slot is vertical and opens incisorly, similar to Angle's ribbon arch bracket, this will hold a .010 or .015 by .028 flat wire. Both wires are locked into the bracket by a single lock pin.

With the use of this type mechanism, the appliance is a positive three-dimensional control. The round wire, when inserted into the brackets, corrects elevation depressions and axial inclination of teeth. The flat wire aids in rotation and uprighting of roots, i.e., torque.

The use of lighter round wires in itself is not new; in fact, Dr. Charles Hawley and Dr. Ralph Waldron recommended their use many years ago.

Here I would like to inject a personal observation. One of the orthodontists' short-sightedness is the fact that many of us take entirely too long to accept new ideas. Light round wires, gnathostatics, Angle's edgewise, Johnson's appliance, cephalometric measurements, retainers, extraction of teeth, etc., are just a few examples.

However, the use of these very small gauge round wires, plus lingual stabilization, permits gentle application of force, plus a means of sectional movement of teeth.

Due to the elasticity and delicacy of the round wires it is possible to seat them at the first visit into their respective attachments. In fact, one does not originally start with a so-called ideal arch because the desire of the operator is to obtain a certain amount of tooth alignment. Further, with the subsequent use of two round wires inserted one can readily see the various combinations that may be used in ligating the teeth. In other words free maximum elasticity of the light round arches is accessible for direct distribution to the teeth individually and collectively for their correct movement from their malocclusion into their normal position.

Dr. Dillon believes that teeth that are in their correct position should not be used to move malposed teeth. Thus, with the use of this appliance, buccal segments may be banded and moved without the necessity of banding or ligating the anterior segment.

If the maxillary teeth have drifted forward resulting in a contracted arch and crowded anterior teeth, treatment can be simplified by utilizing either this appliance or let us say the philosophy behind it. In the past, one of the steps was to widen arches immediately. We now know that this results in moving teeth out of the cancellous bone into the cortical plate and forcing the distal movement into hard bone.

Utilization of the Atkinson philosophy permits the simplification of treatment. The essayist realizes that the type of appliance is not the all-essential, because the result may be accomplished with any of the recognized orthodontic appliances. However, we are discussing the universal appliance and will permit you to see how it may be applied to the type you are using.

You will recall that I explained that the cancellous bone widens from the anterior to posterior area. Thus, as the molars are moved distally to their correct position, they widen in position, also simultaneously releasing the pressure on the anterior teeth. When this step has been reached, the anterior teeth may be banded and moved into arch alignment comparatively easily. The molar teeth may be moved distally by the use of sliding intermaxillary hooks, called by Case "Maxillary Span Glider," which transmits the force directly to the molar teeth. The intermaxillary force causes the distal move of the molars, and the transeptal fibers connecting each tooth, causing the premolars to move distally along the arch wire. With the use of sliding intermaxillary hooks one is able to control the unruly or forgetful patient. When the elastics are not worn no movement favorable or unfavorable can occur. The anterior segment, composed of the canines and lateral and central incisors, usually follows due to several factors; namely, the pressure that may have originally displaced them has been relieved permitting the natural force of lip pressure to work, and the normal distal drift. When the buccal segment has been corrected, then the anterior teeth may be banded and finally corrected, with a force intended for their own individual movement.

Naturally, stabilization of the mandibular teeth is required to prevent forward displacement. The rapidity of the movement plays an important part in the nondisplacement of the mandibular incisors. The so-called "mushing out" of mandibular anterior teeth is observed when the following precautions particularly are not observed: insufficient anchorage; binding of sliding intermaxillary; premolars ligated too tightly or too great elastic force.

The danger of causing the mandibular teeth to be moved off the ridge is not a new orthodontic problem. With sufficient lower anchorage and the intermittent force of eight hours of external elastic force, plus sixteen hours of intermaxillary force, it may be prevented.

Applying the philosophy one step further, the variety of sectional treatment is enormous. Individual teeth may be rotated, uprighted, moved mesially, distally, buccally, etc., with the minimum of appliance and the maximum of efficiency.

The universal appliance and its philosophy meets to a high degree of perfection the exacting needs of an orthodontic mechanism.

The apparatus has force enough to stimulate the bone cells, which means that it shall produce an increased blood supply to the part and thus excite and nourish a greater cellular activity. But it is not powerful enough nor sudden in its action as to traumatize and so cause inflammatory reactions, with blood stasis, cellular disintegration, and death.

This may be summed up concisely by quoting from a paper presented before this Society by Dr. Ralph Waldron: "In orthodontics the most successful practitioner is not necessarily the one who possesses the most digital skill, through his ability to bend or manipulate wires, nor the one who can make an appliance in the shortest time; but he, who having developed a mastery of producing an instrument capable of applying therapeutic forces in a field in which he is thoroughly familiar, produces that force with the greatest dispatch and effectiveness and with the least possible damage to the peridontium and surrounding tissues.

"With expert strategy in orthodontics the use of extremely delicate appliances is more effective in tooth movement than a heavier application of force."

One very important mechanical principle that an appliance must possess is its ability to move the crowns and roots in all directions.

In order to explain this properly we must understand that all appliances using one arch wire and one slot accomplish this movement of teeth with only one arch wire. With the use of one wire various bends must be made often on the wire. This in turn may cause unexpected force in some other area. One must always remember "where there is an action, there must be a reaction." Further, with the use of a single wire when force is applied to the anterior teeth and premolars, the molar teeth are disturbed.

Now to return to the philosophy behind the Atkinson universal appliance. By the use of sectional strategy, each component part has its own function to perform.

The .010 and .012 round wire when inserted into the horizontal gingival slot changes the axial angle of the teeth mesiodistally, takes care of elevation or depression, or, in other words, causes so-called tooth alignment.

Whereas the flat .010 by .028 sprung into its incisal slot will rotate teeth or torque, thus correcting the roots and crowns buccolingually.

These wires may be used individually, independently of each other, or together. They may be used in segments or as a complete arch. In whatever combination they are always under the control of the operator.

In conclusion I wish to quote Dr. Spencer R. Atkinson's summary of a paper published in the *Journal of the American Dental Association*, April, 1937.

"Success in orthodontic practice depends not only upon the making and manipulating of appliances, but also on the operator's ability to develop an effective strategy for the treatment of each case.

"Malocclusion falls naturally into two main divisions, each having its own distinct strategy of treatment. They are: (1) mass occlusion, affecting the entire denture and skull relationships, and (2) regional or localized malocclusion.

Mass malocclusion is caused by conditions of heredity, the general physical condition, or extraneous pressure affecting the entire denture. A first requisite of treatment is the detection and elimination of the extraneous pressures.

"The key ridge of the superior maxillary bone is a distinct aid in the diagnosis of denture-skull relationships.

"Cases of mass malocclusion in which the upper denture is anteriorly placed call for retrusion rather than expansion in the forward position. The lateral segments are retruded first, after which the anterior segment is corrected.

"Regional malocclusion is caused by extraneous pressure, extraoral or intraoral conditions affecting localized areas. The etiologic factors must be eliminated.

"Postural habits may be detected by means of a specialized candid camera.

"Bone deformities which accompany malocclusion may be diagnosed from both the impression and the study models.

"Regional malocclusion calls for regional treatment. This is accomplished by stabilizing the anchor teeth with the lingual arch and moving other teeth by judicious use of arch segments or complete arches.

"The labial arch wire is divided into two small resilient arches, locked in a single bracket having two slots and known as the universal bracket. Each arch performs a definite function.

"By this strategy, the application of pressure is gentler and more nearly continuous; there is less discomfort; treatments are less frequent, and results are attained more rapidly."

HEREDITY AS A FACTOR IN CRANIAL AND FACIAL DEVELOPMENT

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SINCE the keynote of this symposium is *Physical Anthropology in Relation to Other Biologic Sciences,* it will be appropriate to outline briefly the way in which physical anthropology, orthodontics, child development, and genetics have cooperated to formulate problems, to secure data, and to analyze results on the general question of the role of heredity in development. A review of the literature revealed a lack of adequate data to be the major obstacle to an understanding of human heredity. Many of the articles dealing with human heredity have been based on empirical and logical argument and have been inadequately documented in their presentation of supporting evidence. Evidence from experimental genetics warrants the belief that the principles of genetics, as we know them today, apply to humans. I seriously doubt, however, if it is safe to assume that knowledge of heredity in other animals gives knowledge of inheritance in humans. We may apply the principles of genetics to human data with considerable confidence; we should hesitate to argue further.

The experience of the geneticist has been especially important to us both in ascertaining what types of data to obtain and in outlining techniques for analysis. The physical anthropologist contributes refined, and, on the whole, accurate measurement and observation techniques. The evaluation of the detailed attributes of the dentofacial complex and the clinical significance of these features has been a very valuable contribution of orthodontics to data collection and to analysis. The staff in child development has provided an elaborate collection of data which permit examination of developmental continuities.

The report which follows is thus the result of cooperative endeavor, and I wish to emphasize the real values which attain when one directs the resources of several fields to the solution of problems.

DATA

The present report is a general summary of the findings based on the following information: Anthropometric measurements and observations on 213 families of Armenian-speaking peoples and on 487 families residing in various parts of the United States, mainly in Michigan. Developmental records on children and supporting measures and observations on parents in 137 families who have children in the University of Michigan Elementary and High Schools. Detailed dental records supported by anthropologic, photographic, and radiographic data on 113 families who submitted themselves to examination in the orthodontic clinic in the Dental College of the University of Michigan.

ANALYSIS

These data have been analyzed in terms of the various interfamilial relationships and by comparing these figures with those when the total series was treated

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as a random sample of the population. Differences between the two sets of figures indicated the operation of familial factors. In general it was assumed that the presence of familial factors indicated the presence of hereditary ones even though it was not possible to attain satisfactory control over environmental forces which, presumably, would be concentrated in family groups. Familial features were further analyzed in terms of the various principles established by experimental genetics.

RESULTS

The results obtained so far are preliminary and exploratory. They enable us to refine our techniques of observation and data collection and aid materially in a more precise formulation of problems that may be attacked systematically.

GENETICS AND GROWTH

From the point of view of development heredity becomes a part of a process that extends at least from conception to maturity. Most, if not all, hereditary features undergo vast changes between inception and adulthood and frequently it is very difficult to describe the end product in terms of its appearance during the process of development. This brings us to an important point. Is growth inherited? And, if so, is it inherited as a general factor which influences the attributes of the body as a whole or is growth different and distinct for each feature? The evidence from the University Elementary School strongly supports the latter viewpoint. Here we find a number of patterns of growth. In some individuals the growth of a single attribute is very much like that of any other attribute so that we may write a growth equation and have it generally descriptive of the total organism. In other individuals the pattern of growth of one attribute is considerably different from the growth pattern of another so that several growth equations would have to be written to describe the development of the total organism. These diverse patterns of growth have a random distribution in the population as a whole and are definitely concentrated within the familial lines. Growth is certainly a familial as well as an individual phenomenon, and although the environmental circumstances within a family are generally concordant toward the production of similarity, experimental attempts to modify some of the growth patterns have met with little success. The evidence, on the whole, indicates growth to be strongly dependent upon hereditary factors. The facial region is composed of many parts which exhibit a rather marked degree of growth independence. Many of the apparent discrepancies in the dentofacial complex due to growth and the resultant malocclusions represent real genetic differences. Growth independence is observable in the cranial region but is not particularly striking. From the standpoint of observation during development hereditary features can be divided into two groups: those which display familial patterns throughout the growth process, and those which fail to give any hereditary evidence until pubertal cycle is established. The majority of anthropometric measures belong in the first group. Many attributes, particularly those showing strong sex difference, appear in the second period. Other features, as pattern baldness, are not amenable to observation until after adulthood has been attained. Recognition of these time or growth sequences is fundamental in data collection and in analysis.

The contribution each parent makes to his child's features needs further study. At present there is little evidence to support the belief that children resemble one parent more than they do the other in craniofacial features. So far as our data go, we have no evidence of *sex-linked* or *sex-influenced* inheritance in the craniofacial complex. The contribution of each parent is of equal importance and the inheritance is autosomal. It is not possible to estimate the number of genes or chromosomes involved. We suspect the number to be large rather than small and would not be surpised to find each of the chromosomes represented in the craniofacial region. This would give twenty-four linkage groups and permit considerable independence of parts.

Most of the craniofacial features, attribute as well as measurement, appear to be multiple factor traits. Single genes segregating normally seem to be the exception rather than the rule. Likewise, completely dominant genes and their recessive alleles are poorly represented. The amount of true intermediacy for the multiple factor traits in the facial region is surprisingly low. The cranial region is more productive of intermediacy.

The following statements serve as illustrations of the above points. When the father and mother are alike in an attribute, the child likeness to parent is 85 per cent and to sib is 88 per cent; the trait is emphasized by the child in 7 per cent of the cases and is clearly different in 8 per cent. When the father and mother are unlike for a trait, the child is truly intermediate between the parents in 17 per cent of cases; the resemblance is toward the father in 37 per cent and is toward the mother in 35 per cent of instances. The amount of divergence from the midparent, or true intermediacy, is not dependent upon the sex of the parent, rather it depends upon the nature of the trait itself. For example, if the male parent presents a broad ovoid maxillary arch and the female parent a narrow V-shaped or tapering arch, the children, on the whole, would show trapezoidal to tapering arches. That is, the resemblance would be *toward* the mother. If it were the male parent who carried the V-shaped arch the resemblance would be *toward* the father. I believe it is the behavior of a number of features like the one illustrated above that has given rise to the proposition that sex of the parent is responsible for the appearance of traits which are autosomal in inheritance. The amount of clear-cut child difference from both parents amounts to 11 per cent.

The incidence of asymmetry is lower in the cranial region than in the facial region, and the number of asymmetries is four times as great among children with asymmetric parents as it is among children whose parents show absence of asymmetry. Facial asymmetries are almost independent of cranial asymmetries.

In the cranial region length, breadth, and height are dependent upon hereditary factors, probably some for each bone of the vault. The three diameters are rather independent of each other in family lines with breadth factors exhibiting a mild degree of partial dominance.

The dentofacial complex is particularly interesting in the marked degree of part independence which it shows. The mandible and maxilla are certainly independent of each other and our evidence goes further to indicate that in the mandible the ramus, body, angle, alveolus, and teeth are not too dependent on each other, while in the maxillary region teeth, alveolus, and maxilla are in-

dependent. Multiple factors are involved in the production of all of these features, and there is a partial dominance shown in what might be called the deficiency group of traits.

The size and shape of the malar bones depend upon genetic factors. Although multiple factors are involved, the number of these appears to be limited and children are generally intermediate between the two parents. Palate height seems to depend upon a single gene segregating normally. Palate width is more complicated; the anterior part appears able to expand or contract quite independently of the posterior part and anterior constriction has a familial distribution which indicates it to depend upon a single dominant gene. Many other features could be listed and described in approximately the same way. These serve to illustrate the extensive operation of heredity in the cranial and in the facial regions.

The use of the word independent in the discussion should, perhaps, be qualified. The total living organism is a more or less well-integrated whole and the amount of absolute independence of parts tends to be limited rather than extensive. Some traits, as individual teeth, ear lobes, bones of hand or foot, may be entirely omitted from the organism without materially affecting its welfare. Other features are permitted but little independence of action without seriously interfering with or even terminating the existence of the organism. The single gene responsible for amaurotic family idiocy or the sex-linked gene responsible for hemophilia serves to illustrate. Teratology abounds with examples of genetic independence too extensive to maintain life. These limitations are recognized in the use of independence in the discussion.

I have already indicated growth and heredity to be parts of the same phenoneon. Any feature we observe has undgone both differentiation and growth. The entire process is lawful and, on the whole, orderly. Geneticists have suggested growth to be due to the action of genes on cytoplasm and differentiation to be due to the separation of different cytoplasmic products of the genes into different cells. However this may be, our evidence supports a belief that the growth of a trait is integral with the heredity of the feature.

ERUPTION TIME OF TEETH AMONG WHITES, NEGROES, AND INDIANS

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INTRODUCTION

THE processes which cause a tooth to emerge from its crypt and erupt through the gum are only partially understood. Theories of the biologic forces which cause a tooth to rise in its socket causing resorption of the alveolar bone and eventual eruption through the gum are largely hypothetical, but are known to be associated with elongation of the root and local hyperemia of the tooth follicle. There are also many local factors known to influence the time of eruption of individual teeth. The present study concerns the influence of race upon the mean time of eruption of teeth and includes a comparison of sexes, mandible and maxilla, and the order of eruption. Any table of tooth eruption time must be based upon a mean with wide latitude of variation for individual cases. Deviation from the mean may be the result of differences in heredity, biologic functions, nutrition, body growth, sex, and race.

The establishment of normal standards becomes desirable when individual cases which deviate from that standard are to be considered. The importance of eruption time of the teeth as a measure of maturity and the separation of the dental age from the chronologic age are of interest to the anthropologist[1] and the orthodontist.[2, 3] The acceleration and retardation of eruption of all or some of the teeth as well as improper order of eruption bear important relationship to some classes of malocclusion.[2] The statistical analysis of dental caries is frequently based upon the probable length of time such teeth have been exposed to local influences.[4]

Eruption of teeth in the races studied is of interest because of the contrasting social status of these groups. Green[5] suggested that in the children of the poorer classes the first molar teeth erupt earlier than those in the well-to-do groups. Rose's tables[6] show that in general the eruption time is earlier in the higher social strata. The races studied in these data presented herewith are from groups who live in very different environments. The Whites are the children of a Dutch population largely engaged as factory workers in Holland, Michigan. The Negroes are from the rural South. The Navajos are from government and mission schools on the Navajo reservation, and the Maya live in primitive rural districts of Yucatan.

The exact ages of the Navajos are less likely to be correct than the other groups, but all ages were recorded carefully.

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The material presented in this report, collected by one of the authors (Steggerda) is from an anthropologic study which includes tooth charts of a large number of individuals from the four previously mentioned races. These data are from the records of one examiner and are of groups of people, each individual of which was examined annually over a period of ten years. A tooth is considered erupted as soon as it has made its appearance through the gum and is tabulated as of the nearest birthday of the individual, i.e., teeth tabulated as of eight years include those which erupted between seven years, six months and eight years, five months. If in any one year an examination of an individual was not made, new teeth which had erupted by the following year were not counted because it was not possible to determine in which one of the two years they had erupted. The count was continued when records had been made for two consecutive years. This is the reason for the apparent discrepancy between the number of examinations of the right and left sides. It has been frequently observed that teeth have a tendency to erupt in pairs although these data contain many examples of the eruption of a tooth on the left side occurring in a different year than the eruption of the corresponding tooth on the right.

In Table I the complete data for the examinations are tabulated. This material is presented in full for the purposes of showing the probable error, in fractions of a year, and for its evidence upon the difference in eruption time of left and right sides. Tomes[7] believed that teeth on the left side erupt earlier than teeth on the right side. Bean[8] was of the opinion that some teeth erupt earlier on the left and others earlier on the right side. Cattell[1] attempted to verify these facts but found that only in one instance, maxillary first premolar, did her data suggest any difference. In the data presented here there are sixteen instances in which the difference in eruption time of the left and the right sides is outside the limit of one probable error, but in no case is the difference statistically significant. Eight of these are on the right side and eight are on the left. As these are generally distributed both as to the tooth involved and the race affected, we must, like Cattell, believe that such differences are due to the chance variation in the material used.

TABLE COMPARISON

In a review of the literature there is some variation in the mean eruption time of teeth. Some tables give figures consistently higher than others. It is probable that this is due to the method of tabulation of the material. In some cases the averages are based, like these, upon the nearest birthday; others upon the actual month and year; while still others consider the year group to include all individuals until their next birthday. As the teeth of the females erupt earlier than those of the males, uneven distribution of sex could also influence the mean eruption time. Allowing for different statistical methods, the tables are in general agreement. This may be well illustrated by comparison of these data with the Logan-Kronfeld[9] table. In only one instance in our observations does the mean eruption time of the male and female White differ from their table. The mean eruption time of the mandibular lateral incisor in this datum is two-tenths of a year above the Logan-Kronfeld table. It is probable

that this difference is of no statistical importance. Any general table of eruption time obscures the differences of sex, race, and the wide variations that occur in individuals. A general eruption table may be based upon the mean eruption time with consideration of the years in which the greatest distribution of eruptions occurs. Upon this basis Table II is given.

SEX

Difference in the eruption time of the sexes has been observed by previously named authors (Klein et al.,[4] Cattell,[1] Hellman,[2] Rose,[6] Bean[8]). In the material presented here the girls' teeth erupt before the boys' in all four races. Table III is a summary of Table I showing to the nearest decimal, in years, the eruption time of the teeth by race and sex. Race and sex discussions are based upon the figures in this table. In the White and Maya races the eruption time of the girls averages five to six months before that of the boys. The sex difference in eruption appears a little greater in the Negroes and less among the Navajos.

The eruption time of the canine teeth shows the greatest difference between the sexes. An average of the four races studied shows that in the females the maxillary canines erupt $9\frac{6}{10}$ months and the mandibular canines $10\frac{2}{10}$ months before the males. The difference in eruption time of the canines is greatest in the Negroes where the canines of the females erupt more than a year before those of the males. Cattell[1] and Klein et al.[4] have shown that because of the earlier eruption in the females they usually have one tooth or more than do the males of the same age. They show that the maximum difference between the sexes occurs in the tenth and eleventh years, at which age the females have two more teeth than the males. The tables presented here support this statement and show that this maximum difference is principally the result of the difference between the sexes in the eruption of the canines. This sex difference is pronounced in all the races and varies from six (Maya) to ten (Negro) times the probable error.

The least difference occurs in the first molars, and in the maxillary first molar there is no significant difference. (See Figs. 1 and 2.) The tables of Klein et al.[4] and Rose[6] place the eruption of the maxillary first molar of the females one month before that of the males, and Hellman's charts[2] show the males to precede the females in the eruption of this tooth. This important difference in the canine eruption and the similarity in the eruption of the maxillary first molar of the sexes may be observed in a careful study of these data and the tables of Rose,[6] Hellman,[2] Cohen,[10] and Klein et al.[4]

The possibility of racial difference in the eruption of teeth has been suggested by previous studies. Cattell's chart[1] suggests that the eruption time of the Italians is on the average a little later than that of the North American Whites. Cattell also suggests that the teeth of Jewish boys erupt in advance of North American boys, but the eruption time of Jewish girls is about the same as that of North American girls. The author makes no conclusive statements. The graphs of Green[5] indicate that, in comparison with other races, the Lithuanians have the highest percentage of first molar teeth erupted at the ages of five, six, and seven. Spier[3] has shown that the teeth of Puerto Rican boys erupt before

TABLE I

ERUPTION TIME OF TEETH SHOWING PROBABLE STATISTICAL ERROR AND THE VARIATION IN ERUPTION OF THE RIGHT AND LEFT SIDES

RACE	SEX	LOWER				UPPER			
		NO.	RIGHT	NO.	LEFT	NO.	RIGHT	NO.	LEFT
					Central Incisors				
Maya	Males	33	7.42 ± .12	33	7.39 ± .13	36	8.33 ± .10	38	8.37 ± .11
	Females	24	7.13 ± .16	24	7.17 ± .15	28	8.32 ± .16	28	8.21 ± .16
Navajo	Males	23	6.83 ± .14	26	6.77 ± .13	47	7.68 ± .10	42	7.62 ± .10
	Females	25	6.48 ± .10	23	6.48 ± .11	31	7.74 ± .09	34	7.68 ± .10
Negro	Males	11	7.00 ± .17	10	6.90 ± .18	17	7.77 ± .16	17	7.77 ± .16
	Females	13	6.31 ± .21	12	6.25 ± .23	25	7.16 ± .12	21	7.10 ± .12
White	Males	40	6.93 ± .05	40	6.93 ± .05	47	7.87 ± .09	45	7.87 ± .10
	Females	37	6.60 ± .05	36	6.56 ± .06	32	7.56 ± .12	33	7.61 ± .14
					Lateral Incisors				
Maya	Males	43	8.51 ± .11	41	8.29 ± .11	52	9.40 ± .12	54	9.20 ± .11
	Females	30	8.13 ± .13	28	8.04 ± .16	33	8.67 ± .13	34	8.59 ± .13
Navajo	Males	44	7.71 ± .09	43	7.72 ± .11	48	8.90 ± .11	44	8.77 ± .12
	Females	34	7.56 ± .09	34	7.32 ± .09	45	8.62 ± .09	43	8.70 ± .08
Negro	Males	15	8.00 ± .18	16	7.88 ± .17	20	8.50 ± .18	20	8.40 ± .17
	Females	22	7.18 ± .15	21	7.19 ± .15	32	8.22 ± .15	28	8.39 ± .16
White	Males	46	8.52 ± .08	43	8.49 ± .08	91	9.18 ± .06	87	9.14 ± .07
	Females	24	8.04 ± .12	21	7.86 ± .15	50	8.76 ± .09	43	8.79 ± .12
					Canines				
Maya	Males	55	11.16 + .11	57	11.16 + .13	55	11.78 + .14	58	11.79 + .16
	Females	43	10.35 + .12	46	10.28 + .12	53	10.96 + .13	49	10.82 + .14
Navajo	Males	74	10.37 ± .09	65	10.14 ± .09	68	11.16 ± .10	65	10.97 ± .11
	Females	58	9.88 ± .10	63	9.73 ± .11	66	10.73 ± .11	60	10.43 ± .10
Negro	Males	38	11.03 ± .15	39	10.95 ± .14	41	11.81 ± .14	42	11.67 ± .15
	Females	43	9.70 ± .13	42	9.76 ± .14	45	10.44 ± .12	41	10.34 ± .14
White	Males	121	10.98 ± .07	121	10.89 ± .08	133	11.80 ± .07	131	11.85 ± .07
	Females	91	10.20 ± .08	88	10.23 ± .08	106	11.33 ± .08	103	11.48 ± .09
					First Premolars				
Maya	Males	50	11.12 ± .14	52	11.15 ± .13	60	10.37 ± .13	60	10.20 ± .12
	Females	46	10.24 ± .13	44	10.23 ± .12	41	10.02 ± .14	47	9.89 ± .13
Navajo	Males	77	10.26 ± .10	72	10.18 ± .10	72	10.01 ± .11	69	10.16 ± .12
	Females	56	10.13 ± .10	56	10.23 ± .09	61	9.79 ± .11	65	9.94 ± .11
Negro	Males	38	10.92 ± .15	30	10.80 ± .16	33	10.88 ± .20	32	10.75 ± .18
	Females	45	10.33 ± .14	45	10.13 ± .12	45	10.11 ± .11	43	10.02 ± .12
White	Males	124	11.19 ± .09	127	11.11 ± .09	118	10.72 ± .09	117	10.72 ± .09
	Females	97	10.62 ± .09	95	10.64 ± .09	95	10.47 ± .10	94	10.57 ± .11

Second Premolars									
Maya	Males	43	12.14 ± .15	49	11.84 ± .17	60	11.68 ± .13	47	11.57 ± .15
	Females	39	11.33 ± .14	43	10.98 ± .14	44	11.07 ± .13	45	10.76 ± .14
Navajo	Males	57	11.26 ± .12	56	11.09 ± .12	54	11.07 ± .11	57	10.72 ± .13
	Females	57	10.90 ± .10	55	11.04 ± .11	48	11.17 ± .15	49	11.59 ± .16
Negro	Males	36	11.53 ± .15	36	11.42 ± .15	38	11.92 ± .15	35	11.91 ± .19
	Females	39	10.74 ± .13	42	10.79 ± .14	48	11.02 ± .12	44	10.91 ± .12
White	Males	125	11.91 ± .10	127	11.80 ± .10	119	11.51 ± .10	124	11.41 ± .09
	Females	90	11.49 ± .11	92	11.73 ± .12	101	11.25 ± .10	96	11.40 ± .11
First Molars									
Maya	Males	27	6.74 ± .12	27	6.78 ± .11	25	6.92 ± .11	25	6.84 ± .11
	Females	13	6.62 ± .20	13	6.69 ± .21	14	6.71 ± .17	15	6.67 ± .18
Navajo	Males	27	6.41 ± .11	29	6.24 ± .10	22	6.68 ± .15	25	6.68 ± .13
	Females	23	6.30 ± .09	31	6.55 ± .10	23	6.48 ± .13	19	6.74 ± .10
Negro	Males	13	6.85 ± .21	11	7.09 ± .20	7	6.57 ± .30	9	7.00 ± .24
	Females	15	6.33 ± .15	19	6.32 ± .15	8	7.13 ± .14	9	6.67 ± .15
White	Males	38	7.03 ± .05	42	6.93 ± .05	39	7.03 ± .04	40	7.05 ± .04
	Females	38	6.58 ± .05	35	6.60 ± .06	40	7.0 ± .11	35	6.94 ± .09
Second Molars									
Maya	Males	67	11.81 ± .13	68	11.91 ± .13	48	12.48 ± .14	51	12.49 ± .14
	Females	55	11.56 ± .15	53	11.42 ± .14	47	12.09 ± .14	43	12.09 ± .16
Navajo	Males	89	11.66 ± .10	91	11.57 ± .10	58	11.52 ± .12	59	11.59 ± .12
	Females	85	11.13 ± .10	95	11.32 ± .09	57	11.42 ± .10	62	11.44 ± .10
Negro	Males	47	12.30 ± .14	45	12.36 ± .15	39	12.49 ± .15	37	12.78 ± .14
	Females	50	11.50 ± .14	50	11.36 ± .14	45	11.82 ± .10	46	11.87 ± .12
White	Males	154	12.40 ± .06	162	12.41 ± .07	138	13.17 ± .08	144	12.93 ± .07
	Females	127	11.87 ± .08	126	11.85 ± .08	111	12.67 ± .09	110	12.56 ± .08
Third Molars									
Maya	Males	34	19.56 ± .37	27	19.48 ± .42	9	19.00 ± .40	7	18.71 ± .47
	Females	13	19.77 ± .67	11	19.46 ± .71	4	18.50 ± .29	3	18.33 ± .37
Navajo	Males	54	17.70 ± .13	58	18.02 ± .13	20	18.15 ± .21	17	18.00 ± .20
	Females	70	17.54 ± .14	70	17.56 ± .14	34	17.38 ± .20	31	17.65 ± .20
Negro	Males	4	18.25 ± .28	5	16.60 ± .31	2	18.50 ± .24	2	18.50 ± .24
	Females	31	18.26 ± .30	34	18.59 ± .34	8	17.25 ± .50	9	17.33 ± .61
White	Males	16	17.13 ± .12	14	17.71 ± .13	3	17.00	3	17.33 ± .37
	Females	8	16.63 ± .26	9	16.78 ± .23	3	17.00 ± .32	3	17.00 ± .32

TABLE II

GENERAL TABLE OF ERUPTION BASED UPON THE MEAN ERUPTION TIME AND THE YEARS IN WHICH THE GREATEST DISTRIBUTION OF ERUPTIONS OCCURS

	CEN.	LAT.	CAN.	1-PR.	2-PR.	1-M.	2-M.	3-M.
Upper	7-8	8-9	11-12	10-12	10-12	6-8	12-13	17-21
Lower	6-7	7-9	10-12	10-12	10-12	6-7	11-13	17-21

TABLE III

ERUPTION TIME OF TEETH OF FOUR RACIAL GROUPS*

RACE		UPPER JAW							LOWER JAW						
		CENTRAL	LATERAL	CANINE	FIRST PREMOLAR	SECOND PREMOLAR	FIRST MOLAR	SECOND MOLAR	CENTRAL	LATERAL	CANINE	FIRST PREMOLAR	SECOND PREMOLAR	FIRST MOLAR	SECOND MOLAR
White	Male	7.9	9.2	11.8	10.7	11.5	7.0	13.1	6.9	8.5	10.9	11.2	11.9	7.0	12.4
	Female	7.6	8.8	11.4	10.5	11.3	7.0	12.6	6.6	8.0	10.2	10.6	11.6	6.6	11.9
Negro	Male	7.8	8.5	11.7	10.8	11.9	6.8	12.6	7.0	7.9	11.0	10.9	11.5	7.0	12.3
	Female	7.1	8.3	10.4	10.1	11.0	6.9	11.9	6.3	7.2	9.7	10.2	10.8	6.3	11.4
Maya	Male	8.4	9.3	11.8	10.3	11.6	6.9	12.5	7.4	8.4	11.2	11.1	12.0	6.8	11.9
	Female	8.3	8.6	10.9	10.0	10.9	6.7	12.1	7.2	8.1	10.3	10.2	11.2	6.7	11.5
Navajo	Male	7.7	8.8	11.1	10.1	10.9	6.7	11.6	6.8	7.7	10.3	10.2	11.2	6.3	11.6
	Female	7.7	8.7	10.6	9.9	11.4	6.6	11.4	6.5	7.4	9.8	10.2	11.0	6.4	11.2

*Because of insufficient numbers of second examinations, all second examinations and first examinations of the sixth and seventh years are included in the data on the central incisors and first molars of the White race.

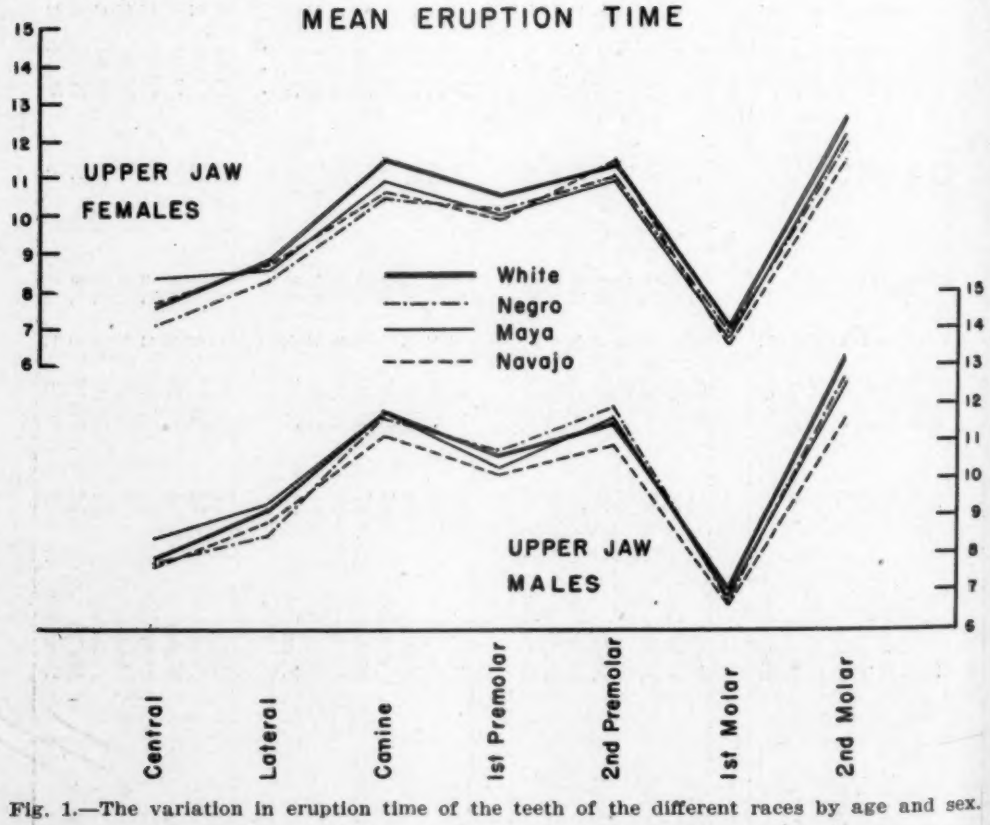

Fig. 1.—The variation in eruption time of the teeth of the different races by age and sex.

the teeth of Boston male school children. However, he thinks the meaning of this is obscured by other factors, such as physical and mental development. The figures presented here show definite racial differences, but there is less difference in the molar teeth than in other teeth. This is especially true of the maxillary first molar in which there is no significant racial difference. However, the mandibular first molar of the Navajo does erupt at an earlier age than any of the other races studied.

In a general way it may be said that the early eruption of teeth occurs in the races studied in the following order: Navajo, Negro, Maya, White. Fig. 3 is a comparison of the eruption time of the average male and female—Negro, Maya and Navajo with the White. Using the base line as the mean eruption time of the teeth of the White race, the graph shows, in months, the mean eruption time of the other races before or after the Whites. There are variations in the eruption of individual teeth in which this order is changed. The central incisors of the Maya are later in erupting than in the other races. This racial difference occurs in the maxillary and mandibular teeth, male and female, and is approximately six months after the eruption of the same teeth in the White, which difference is 4.5 times the probable error. All other Maya teeth, except mandibular canines, erupt before those of the Whites. The first premolar and the second molar are most pronounced in their early eruption.

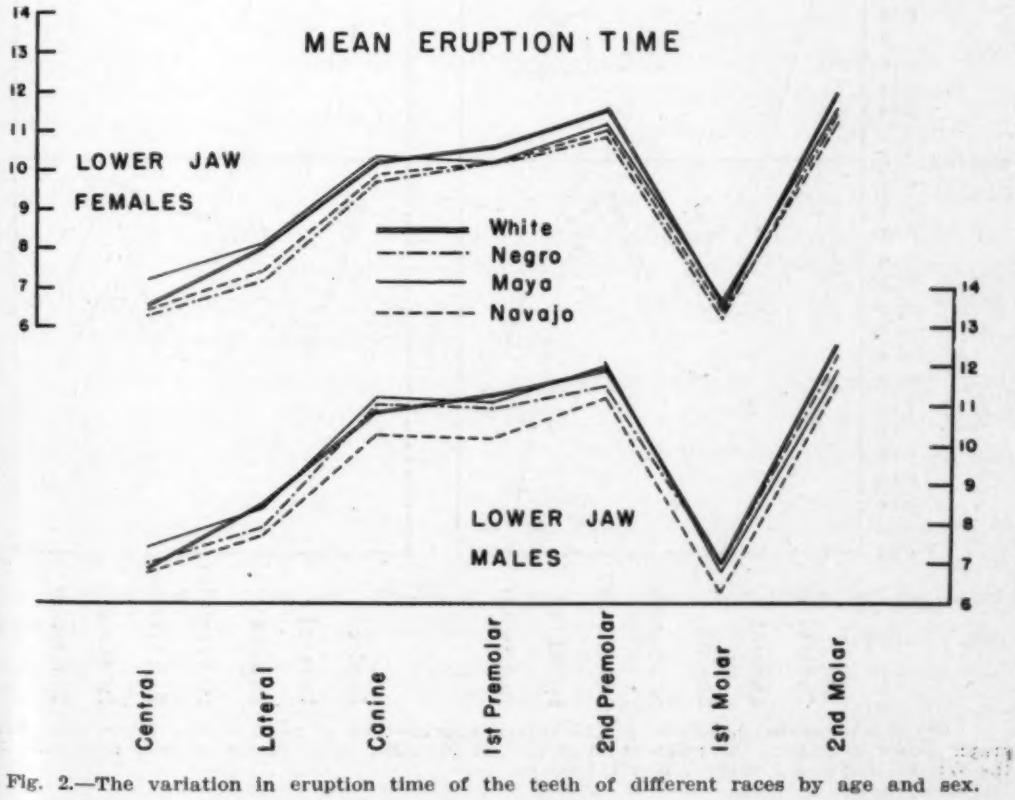

Fig. 2.—The variation in eruption time of the teeth of different races by age and sex.

The teeth of the Negroes erupt earlier than the Whites. There are some instances in which the eruption time of these races is not statistically significant. The eruption time of all the teeth of the Negroes is earlier than that of the Whites except the maxillary second premolar. The maxillary cuspid of the

female erupts a year ahead of the female White. This difference is nine times its probable error.

The teeth of the Navajos have the earliest eruption time of all the races studied. In all instances, except the maxillary and mandibular central incisors and maxillary first molars, the teeth erupt at a significantly earlier age than in the Whites. This variation is from 3 (upper lateral) to 15 (upper second molar) times the probable error. In the female the difference in the eruption time is less marked but is earlier in all teeth. When racial comparisons are made there are some outstanding differences. By computing the average of the combined males and females and using the White race as a standard, the early eruption in the other races is most marked in the maxillary canines, first premolars, and second molars, and the least marked in the first molar teeth. (See Fig. 3.) In the mandibular teeth the greatest difference is in the lateral incisors, second premolars, and the second molars. In all the significant racial differences the teeth of the Navajo, Negro, and Maya erupt before the teeth of the White with the exception of the Maya central incisors.

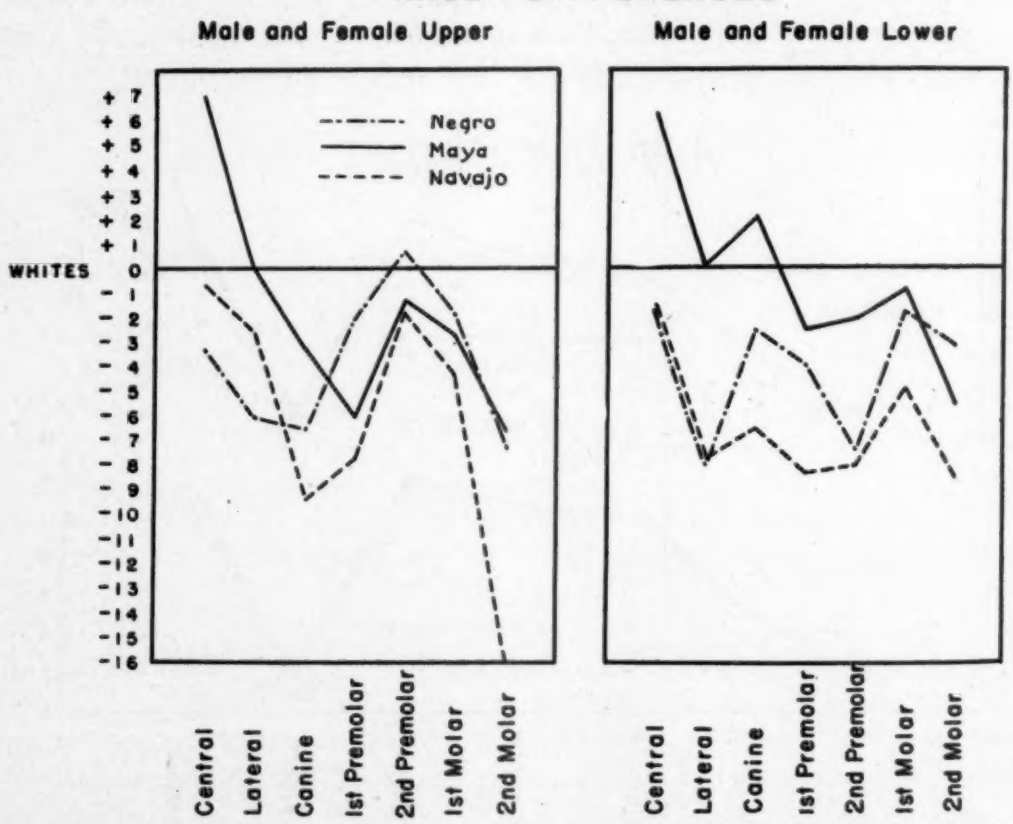

Fig. 3.—Using the base line as the mean eruption time of teeth of the White race, the graph shows, in months, the mean eruption time of the other races earlier or later than that of the Whites (minus [–] earlier; plus [+] later).

ERUPTION ORDER

The mandibular teeth usually erupt before the corresponding teeth in the maxilla, but this difference has great variation. It is very pronounced in the

canines, while in the molars the difference is small. In a few instances the maxillary teeth erupt before the mandibular teeth. At other times the difference in eruption time of the upper and lower teeth is of no significance. In the White race the maxillary second premolar tooth of both males and females erupts before the corresponding tooth in the mandible. This condition also exists in the Navajo male and female and in the Maya male. The Navajo maxillary first premolar erupts before the mandibular in the female. In all other cases the mandibular teeth erupt before the maxillary, or the difference is within the probability of statistical error. Previous mention has been made of the early eruption of the canine in the female. This is again observed in the eruption order. The canine of the female erupts before the second premolar in the maxilla which is the same eruption order as the mandibular in the male. In the female the mandibular canines erupt before both the first and second premolars.

TABLE IV

ORDER OF TOOTH ERUPTION

♂	Upper	1st molar	central	lateral	1st prem.	2nd prem.	canine	2nd molar
♂	Lower	1st molar	central	lateral	1st prem.	canine	2nd prem.	2nd molar
♀	Upper	1st molar	central	lateral	1st prem.	canine	2nd prem.	2nd molar
♀	Lower	1st molar	central	lateral	canine	1st prem.	2nd prem.	2nd molar

The order of eruption time appears to be the same in all races. (See Table IV.) There are four instances when there are slight variations but each of these is the result of small differences in the averages and all are within the probability of statistical error. From Table IV it will be observed that the differences in order of eruption which occur in the two sexes or between the maxilla and mandible are in the order of eruption of the canine tooth. It has been noted that the greatest difference in the eruption time of the maxillary and mandibular teeth is in the early eruption of the mandibular canine and the greatest difference between the eruption time of the sexes is in the earlier eruption time of both canines. The results of these differences are:

1. In the male maxilla, the canine erupts after the second premolar, and, while the mandibular teeth in general erupt before the maxillary, the canine erupts relatively earlier than the rest of the teeth and erupts before the second premolar.

2. Because the greatest difference in the eruption time between the sexes is in the canine tooth, the maxillary canine of the female erupts before instead of after the second premolar, which is the same eruption order as the male mandibular teeth. Inasmuch as there is relatively earlier eruption of the mandibular canine than of the other lower teeth, in the female it erupts before the first premolar.

SUMMARY

1. A table of mean eruption time of males and females for four races is given.

2. The eruption time of the left and right sides is the same.

3. There are racial differences in eruption time. The early eruption time of teeth is in the following order: Navajo, Negro, Maya, and White.

4. There are sex differences in eruption time of teeth, most marked in the canine teeth.

5. Difference in eruption time of maxillary and mandibular teeth is greatest in the canine.

6. The order of eruption is the same in all races but is different in maxilla and mandible and in the sexes.

7. In the male maxilla the canine erupts after, and, in the mandible, before the second premolar. In the female maxilla the canine erupts after, and, in the mandible, before the first premolar.

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DEGREE OF MESIODISTAL PHYSIOLOGIC WANDERING OF TEETH AFTER EXTRACTION OF THE SUPERIOR FIRST PERMANENT MOLAR

A Preliminary Report

Norman Burmeister Shipley, D.D.S.,* Bethesda, Md.

INTRODUCTION

IT HAS been stated in the literature that after the extraction of a tooth, the neighboring teeth tend to tilt toward the vacant space and may obliterate it by approximation of the crowns.[1] A few clinicians[1, 2, 3] have published articles in which they state that this movement has occurred. Salzmann after measuring 500 school children states, "When we measured the amount of space remaining at various intervals after the extraction of the first molar teeth, we found that although the space remaining tended to grow smaller as the interval after extraction increased, the rate of closure was not uniform in all instances."[2]

PURPOSE

It has been attempted in this problem to measure the space which has occurred due to the extraction of the first maxillary permanent molar and to calculate the degree of movement mesiodistally of the second maxillary premolar and second molar in adults.

PROCEDURE

By means of an inside caliper thirty-four spaces created by the extraction of the first maxillary permanent molar have been measured. By means of a straight caliper we measured the mesiodistal diameter of the opposite first maxillary permanent molar in each of these thirty-four cases to be used as a standard in determining the amount of closure of the space. This was accomplished by subtracting the measurement of the space from the mesiodistal diameter of the

Table I

Average Movement of Teeth in Millimeters Measured From One to Thirteen Years After Extraction

YEAR PERIODS	1	2	3	4	5	6	7	8	9	10	13
Cases	1.8	2.2	2.6	4.2	8.6	3.3	3.4	6.1	8.6	4.9	8.5
Cases	1.3	1.9	3.3	5.4	6.1	6.7	6.6	7.2		6.5	
Cases	0.2		5.7	3.4	4.0		3.4	7.8		9.7	
Cases			2.0	4.2				6.8		8.9	
Cases			2.0	5.6							
Cases			5.2								
	1.1	2.05	3.4	4.5	6.2	5.0	4.4	6.9	8.6	7.5	8.5

From the U. S. Naval Dental School, Bethesda, Md.
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opposite molar. In each case the patient was asked how long this particular tooth had been missing. The degree of movement was recorded and averaged from one- to thirteen-year periods.

RESULTS

It has been found in this problem that the average movement mesiodistally of the second maxillary premolar and second molar is 5.28 millimeters ranging from an average movement one year after extraction of 1.1 millimeter to an average movement ten years after extraction of 7.5 millimeters. Table I shows these average movements over a thirteen-year period and Fig. 1 shows the increase movement over these years.

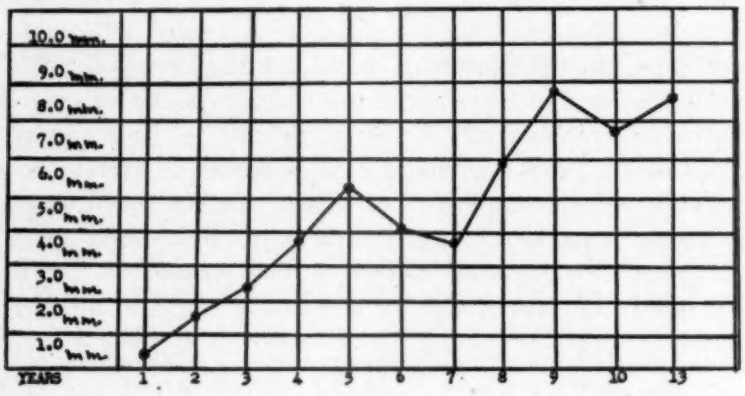

Fig. 1.—Increase in movement measured in millimeters from time of extraction.

CONCLUSION

Since only so few measurements have been made nothing of a conclusive character on rate increase of tooth movement can be drawn. Although a comparative lack of uniformity exists, yet generally the degree of movement of proximating teeth seems to be somewhat proportional to the time the tooth is absent, with some exceptions.

NOTE: The opinions or assertions contained in this article are the private opinions or assertions of the writer and are not to be construed as official or reflecting the views of the Navy Department or the Naval service at large. (Article 113, U. S. Navy Regulations.)

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Pharmacology and Dental Therapeutics. A Textbook for Students and Practitioners: By Hermann Prinz, A.M., D.D.S., M.D., Sc.D., Dr. med. dent., Professor Emeritus of Materia Medica and Therapeutics, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania, and U. Garfield Rickert, A.M., D.D.S., Late Professor of Diagnosis, Dental Therapeutics and Radiology, School of Dentistry, University of Michigan. Eighth edition, thoroughly revised by Edward C. Dobbs, D.D.S., Associate Professor of Pharmacology, Baltimore College of Dental Surgery, Dental School, University of Maryland; Member of the Associate Committee on Dental Preparations of the National Formulary Committee. Pp. 505, Price $6.50, St. Louis, 1941, The C. V. Mosby Co.

This has been an accepted standard work on pharmacology and dental therapeutics for over forty years. The present edition, the eighth since the book was first published in 1909, has been completely revised and the title has been changed from *Dental Materia Medica and Therapeutics to Pharmacology and Dental Therapeutics* in order to conform with the change in emphasis from materia medica to pharmacodynamics. The drugs and preparations mentioned in the present revision have been brought up to date and conform to the latest revisions of the *United States Pharmacopoeia,* the *National Formulary,* and *New and Nonofficial Remedies for 1940,* and the sixth edition of *Accepted Dental Remedies.*

The nature of drug action and the method of administering medicines are discussed. Many formulae are provided of preparations for use in the mouth and on the teeth. The pharmacologic action of local and general anesthetics is discussed. Sulfanilamide and its derivatives are included in the subject matter. The authors advise the novice to obtain consultation before prescribing the drug or else to have the patient hospitalized for observation and regular blood studies. They point out that the drug is highly poisonous to some patients and may produce a variety of toxic symptoms such as acidosis, fever, dermatitis, hepatitis, anemia, leucopenia, and death. The use of sulfanilamide and its derivatives in dentistry, these authors feel, is still in the experimental stage. For local application the authors quote Kayne as suggesting a crushed 5-grain tablet to be inserted in the infected alveolus and repeated if necessary. The use of arsphenamine as a local application in Vincent's stomatitis is described.

The present edition was revised by Dobbs who has produced a practical and modern work from which outmoded drugs and remedies have been eliminated.

The chapters on anesthetics are complete in their description of the pharmacologic action and on the method of employing specific drugs. Horace Wells is credited with the introduction of nitrous oxide to the practice of dentistry.

The organization of the subject matter will make it possible for the practicing dentist to use this book constantly as a practical text and reference. An adequate index has been provided.

J. A. S.

The Etiology of Acute Infectious Gingivostomatitis (Vincent's Stomatitis): By William C. Black, M.D., San Diego, Calif., *J. Pediat.* **20**: 145, 1942.

The purpose of this report is to present clinical and experimental evidence to prove that the herpes simplex virus is the primary etiologic agent of that common disease of early childhood which in a previous publication I have designated by the descriptive term "acute infectious gingivostomatitis," a disorder variously known as Vincent's stomatitis, Vincent's angina, ulcerative or ulceromembranous stomatitis, fusospirochetal stomatitis, trench mouth, etc.

Filtrable viruses and etiology.—Filtrable viruses cannot be dealt with exactly as are bacteria in establishing an etiologic relationship to a specific disease. Nevertheless, the spirit of Koch's postulates still guides us. Rivers, in a discussion of viruses and Koch's postulates, states, "(a) A specific virus must be found associated with a disease with a degree of regularity. (b) The virus must be shown to occur in the sick individual not as an incidental or accidental finding but as the cause of the disease under investigation." In dealing with an ubiquitous agent, such as the virus of herpes simplex, evidence of an etiologic relationship to the disease in question should be viewed critically lest we be misled in the same manner as the proponents of the fusospirochetal theory have been in the past.

One might expect to obtain a frequent history of exposure, either to someone with a "cold sore" or to a case of the disease in question. In 7 of the 21 patients (i.e., 33 per cent), there was a definite history of intimate exposure to someone with a herpes simplex lesion of the lip, and in 2 other patients (9.5 per cent) there was a known exposure to a case of acute infectious gingivostomatitis, making a total of 42.5 per cent of the cases which followed known exposure to the herpes simplex virus. On the other hand, only 1 (7.7 per cent) of the 13 control patients gave such a history of exposure.

The seasonal incidence of acute infectious gingivostomatitis should parallel the seasonal incidence of other types of herpetic infection in the same community. No accurate data on the seasonal incidence of "cold sores" in this locality during the course of this study could be obtained. However, it is a local clinical impression that "cold sores" in ambulatory patients occur more frequently in the summer when the predisposing factors of sunburn, chapping, windburn, etc., are most active. Sixteen, or 76.2 per cent, of the patients were observed in the six calendar months from April to October, which indicates a probable correlation of seasonal incidence.

There should be no basic incompatibilities between the known clinical effects of herpetic infection and the clinical features of this disease. No basic in-

compatibilities between the known clinical effects of herpes simplex virus disease and the clinical features of acute infectious gingivostomatitis have been observed. Known herpetic lesions and acute infectious gingivostomatitis have these fundamental features in common: they are superficial, usually occur in or near the mouth, run a self-limited course, and are free from complications. The striking difference in age incidence may harbor the explanation of the diversity of gross appearance, although in view of the fact that older children and adults are also occasional victims of acute infectious gingivostomatitis, other factors besides age are certainly operative. Among the other and as yet unappraised possibilities are route of inoculation, dose of virus, virulence of virus, and the state of immunity of the host. The lesions of "aphthous stomatitis" and the solitary "canker sore" are grossly more suggestive of the usual activity of the herpes simplex virus than are the relatively diffuse lesions of acute infectious gingivostomatitis.

Evidence indicates that fluid from a herpes simplex vesicle containing the herpes simplex virus upon inoculation into the gum of a 1-year-old child was followed by the development of an illness typical of acute infectious gingivostomatitis. The inoculated child manifested no humoral immunity to the herpes virus before the inoculation but after recovery did have such an immunity and was also refractory to oral inoculation with a known virulent case-isolated strain of the virus. The virus, absent from the mouth before the original inoculation, was recovered during the illness and was still present in the mouth two weeks after complete clinical recovery but was absent another week later. At no time before, during, or after the illness were treponemas, spirilla, or vibrios found in the lesions or in the gingivodental sulcus. Fusiform bacilli were constantly present. An older child simultaneously inoculated, and who had no humoral immunity, developed no widespread oral lesions or constitutional symptoms but did develop two shallow white virus-containing ulcers indistinguishable grossly from ordinary "canker sores."

Humoral immunity to the herpes simplex virus should develop during the course of the disease. In ten cases the serum was examined for the presence of herpes virus neutralizing properties on or before the seventh day of the disease. In seven cases no immunity was present. In three cases immune bodies were present. In nine of these ten cases the serum was subsequently examined one or more times and in every instance in at least one of the subsequent examinations the serum contained indisputable herpes virus neutralizing properties. In one case thirty-nine days after the onset and in another case five months after the onset questionable results were obtained.

The herpes simplex virus is not only present in the lesions of the disease but is the etiologic agent of acute infectious gingivostomatitis. Granting the accuracy of the findings reported in this paper, no other interpretation is plausible. That the presence of the virus in the lesions of the disease is neither incidental nor accidental but is the result of a true etiologic relationship is attested to by the facts described in detail in the preceding sections of this report, which may be summarized as follows:

1. The virus is not commonly present during childhood in the normal mouth, nor in mouths which are the sites of other types of inflammation such as

aphthous stomatitis, canker sores, Vincent's angina, measles, etc., whereas the virus may be found on a single examination during the first few days of the infection in approximately 90 per cent of the cases of acute infectious gingivostomatitis.

2. Humoral immunity, as indicated by virus neutralization tests, is constantly present after the disease has run its course but is not commonly present during the early stages of the disease.

3. Intimate exposure to a source of herpes virus was known to have occurred in over 40 per cent of the cases of the disease, whereas only 8 per cent of the cases of other types of oral inflammation gave a history of exposure to active herpetic lesions.

A typical attack of acute infectious gingivostomatitis in a 1-year-old child followed inoculation of this child's mouth with fluid from the vesicles of a herpes simplex lesion on the lip of an adult. Thus the criteria necessary to prove virus etiology as enunciated by Rivers have been completely satisfied and the conclusions reached by Dodd, Johnson, and Buddingh have been verified.

1. Acute infectious gingivostomatitis (Vincent's stomatitis, Vincent's angina, ulcerative or ulceromembranous stomatitis, fusospirochetal stomatitis, trench mouth) is caused by the herpes simplex virus.

2. The disease should now be known as acute herpetic gingivostomatitis.

3. The fusospirochetal organisms play no essential primary or secondary role in the pathogenesis of the disease.

4. Lesions containing the herpes simplex virus are common sources of the infection for young children.

5. No specific treatment for the disease is known. General supportive and local hygienic procedures may be relied upon to be followed by complete recovery.

Panel Discussion on Clinical Aspects of Growth and Development:

Chairman: Arnold Gesell, Ph.D., Sc.D., M.D., New Haven, Conn.

Associates: L. Emmett Holt, Jr., M.D., Baltimore, Md.
Catherine S. Amatruda, M.D., New Haven, Conn.
Winthrop M. Phelps, M.D., Baltimore, Md.
C. Anderson Aldrich, M.D., Chicago, Ill.

Eleventh Annual Meeting of the American Academy of Pediatrics, Boston, Massachusetts—October 11, 1941. *J. Pediat.* **20**: 259, 1942.

Chairman Gesell.—Development as well as disease is now a recognized concern of clinical pediatrics. But general medicine has become psychosomatic medicine. It hyphenates mind and body, which means that the clinician who attempts to appraise the total child must take into account all types of symptoms, including those which go by the name of behavior. The behavior patterns of infant and child are the most comprehensive index of the integrity and maturity of his nervous system.

Successful diagnosis, prognosis, guidance, and supervision all demand a shrewd appraisal of behavior equipment, behavior potentialities. This is true

not only of the staple behavior problems, anorexia, thumb-sucking, enuresis, tantrums, etc. It is even more true of those important and more permanent conditions which are primarily developmental. They include amentia (mental deficiency), cerebral injuries acquired before, during, or after birth, convulsive disorders and endocrine disorders, sensory handicaps, partial blindness and deafness, environmental retardation from institutionalization and hospitalization, and numerous neurologic deviations and deficients. None of these conditions can be adequately diagnosed or interpreted without an appraisal of behavior characteristics.

Dietary Factors in Physical Growth. By L. Emmett Holt, Jr., Baltimore. —In discussing the relation between diet and growth, I want first of all to raise the question as to whether maximal growth and optimal growth are identical. It is often assumed that they are. "The bigger the better" has been called our American slogan. I should like to point out that this is still an open question. It is clear that an abundance of good food tends to increase the size of the species, but we do not know that there is any corresponding increase in gray matter. It may be that in time we shall find that the most successful individual in life is the small, wiry individual rather than the Goliath.

We have learned that proper nutrition begins in fetal life. It is clear that better bones and teeth are secured by the administration of adequate vitamin D and calcium during pregnancy, and that an adequate iron intake during pregnancy often will prevent the development of anemia in the child. Even more arresting is the possibility of preventing malformations in the young by the maternal diet.

We have lost much of our religious awe of breast milk. It is known in many respects to reflect the maternal diet in its composition rather than to be an ideal nutriment designed by the Creator. We now know that its fat does not represent the ideal but tends to reflect the fat recently eaten by the mother, that its protein content may be inadequate for some premature infants, that it may supply insufficient iron for hemoglobin formation, and, most important of all, that it is often deficient in vitamins. These shortcomings are seen particularly in the underprivileged economic groups in which the maternal diet is often inadequate in some respects. Supplements of vitamins C and D are of particular importance; supplements of iron and of the B factors may be introduced in the form of natural solid foods or, quite as satisfactorily, by means of cereals which are reinforced in these respects.

I think the recent tendency to give solid food early to the artificially fed infant is also a sound one, since its net result is to provide iron and vitamin supplements and to provide these supplements in a balanced form.

The food requirements of the sick infant may differ greatly from those of the healthy infant. Food ingested may be incompletely absorbed in disease, it may be poorly utilized after absorption, and there may be a greater requirement of one or another foodstuff or factor caused by the increased metabolism associated with fever.

Despite the enormous exploitation of vitamins and an unparalleled national expenditure for these products, we still have deficiencies with us. It seems as

if the problem cannot be satisfactorily solved by vitamin supplements. A more foolproof method must be adopted; namely, complete fortification of the milk supply used for infant feeding with all essential mineral and accessory factors. I believe that we shall see this in a relatively short time. There are technical difficulties, such as the incorporation of vitamin C in stable form, but there are indications that these difficulties can be overcome. With such a food and with suitable legislation to control its standards, deficiency disease in the young subject should receive its death blow and a major cause of impaired growth will have been removed.

Chairman Gesell.—You have made it very clear that the dietary factors have considerable significance from the standpoint of developmental differentiation as well as from the standpoint of nutrition. Do you think that these biochemical differences hold equally for individual patients and are of the same character?

Dr. Holt.—There are instances of siblings and of twins living in the same household in which one infant developed rickets and the other failed to do so. Such observations suggest that there are differences in the requirements of individual subjects for these food factors.

Developmental Neurology. By Catherine S. Amatruda, M.D., New Haven. —In the Clinic of Child Development at Yale we have developed a systematic method of examination which discloses the maturity of the developing nervous system and also its integrity. With a knowledge of normal behavior patterns and a knowledge of the development of these patterns and their coordination with each other, we can recognize the presence or absence of these patterns, whether they are normal or deformed and abnormal, and we can interpret the significance of the patterns we see. The developmental examination is a practical method for appraising the competence of the neuromotor system.

Maturity Factors in Neuro-Orthopedic Handicaps. By Winthrop M. Phelps, M.D., Baltimore.—Neuro-orthopedic handicaps can be classified in several ways. First, as regards the location of the lesion, they may have origin in the brain, spinal cord, or in the peripheral nervous system. More important, from the maturity standpoint, is the time at which the lesion occurred. A lesion present from the time of birth or acquired within the first two weeks of life will result in a very different final clinical picture from that seen in an identical lesion acquired later. This is because certain normal developmental characteristics of the motor system have been primarily prevented in the first case but had been previously learned and then interfered with in the second. The study of the normal maturity characteristics can be greatly aided by observation of the reactions when normal motor development is blocked.

It becomes apparent that the time of onset of a motor disability is of great significance, especially with regard to the motor clinical picture which results, but also in connection with the type of re-education indicated. Before these can be clearly evaluated, it is necessary also to determine the substitutions which have occurred. It is impossible to deprive an individual of any specific motor ability without expecting a different type of motor activity to take its place.

In the case of the legs, when walking is prevented, rolling or crawling may be overdeveloped and the use of walkers which support the weight and eliminate the necessity for learned balance may seem to the child so satisfactory as to prevent him from further efforts at free walking. In arm handicaps, where the legs are essentially normal, there may be a substitution of the legs for the arms, and they are used for turning pages and moving toys so well that the arms become more and more neglected. In the speech field it has been found that the usual compensation is sign language. There is, however, nearly always a great increase in general motor activity. The mentally normal speechless child is always overactive both in walking and in the types and intricacies of arm use. This frequently overflows into the behavior field, and temper tantrums, biting, head banging, and similar behavior are seen. This should not be mistaken for mental deficiency, a priori, as in many instances the establishment of speech will of itself cause a complete return to normal behavior.

In conclusion, it may be said that there are four motor developmental periods: (1) birth to 18 months, when the fundamentals are learned; (2) 18 months to 11 years, which is a latent period and physical growth is responsible for changes; (3) 11 years to 18 years, when skills are learned; and (4) 18 years on when perfection of previously learned motor patterns takes place.

The age of onset of a handicap is very important in a determination of its clinical picture and effects on the individual. Treatment is largely dependent on knowing the age of onset and evaluation from this of the type of treatment advisable.

The whole developmental picture is so complex that it is probably impossible for any one of us to think of all the factors that come into it. I am sure that the nutritional factors would very much influence the motor skill, and I imagine Dr. Holt would agree that some of the vitamin B difficulties would disturb the nervous system enough to interfere with skills.

Dr. Aldrich.—Dr. Holt, how early do you feel it is advantageous to add solid foods, cereal, and vegetables to infants' diets?

Dr. Holt.—It is our practice in Baltimore to start solids at about the fifth month. It seems to me that no hard and fast rule should be laid down. It is possible to upset a baby's digestion by the unwise use of solids but this should not occur if one exercises a certain amount of intelligence.

Question.—Does Dr. Holt approve the use of four or five vitamin preparations such as Vi-penta, Hepi, Multicebrin, and so forth?

Dr. Holt.—Since we do not know all the factors of the B complex, it seems wiser to employ foods such as liver, yeast, and wheat germ and concentrates made from them which presumably contain all the factors, using the pure vitamins only as supplements in the case of specific or suspicious symptoms.

Chairman Gesell.—Dr. Aldrich, would you speak on Dr. Holt's point about the inadequacy of breast milk?

Dr. Aldrich.—I agree thoroughly with the idea of Dr. Holt that very likely there may be serious deficiencies in the prenatal nourishment of the baby and also deficiencies in the breast milk. Many years ago I made a very superficial sort of a study of the diets of the mothers of sick young babies at the Children's

Memorial Hospital. Those diets, pediatrically speaking, were grossly deficient, and theoretically, at least, could not provide the unborn child with adequate nourishment. I felt that we could not expect to make good babies out of poppy seed rolls and coffee.

Dr. Holt.—I would like to make my own position clear. I was not criticizing breast feeding, for I believe in it. Nor was I insisting on breast milk. I merely advocated supplementing it.

Question.—Dr. Phelps, what is the optimal time to start active physiotherapy in spastics? Is it best to accentuate training in the performances they do best?

Dr. Phelps.—I think the best time to start training is as early as you can possibly get the child. Methods of training can be developed which can be almost reflex in their nature and not dependent in any way on the cooperation of the child. There are many little pantomime exercises to which the child can be conditioned by rhymes and by other rhythmic sounds. The earlier these can be started the sooner bad habit formations will be eradicated.

Question.—Dr. Phelps, if skills are not developed until after the age of 11 years, then why start children in piano or violin or dancing before this age?

Dr. Phelps.—I have often wondered about that. I started violin lessons at the age of 6, but in looking back it does not seem to me that I made any progress in skill before 11. I did learn the fundamentals, so that when the time came to play difficult music, the mechanism was there. But I do not think that skills develop very much before 11.

Developmental Diagnosis and Clinical Pediatrics. By Chairman Gesell.—In the light of the discussion this morning it seems clear that pediatrics is bound to enlarge steadily the scope of its clinical protection of infants and young children. Who could possibly take over the developmental problems and solve them apart from medical diagnosis and medical supervision? We cannot conceive a separate and independent mental hygiene service when it is realized that the first three years of life are almost entirely under the care and oversight of the pediatrician, as child specialist and as general practitioner.

The practicing pediatrician has three functions: diagnosis, therapy, and supervision, and the greatest of these is diagnosis.

No one can predict the shape which the clinical diagnosis and supervision of child development will assume in the future. It is probable that with the return of peace, there will be a much greater mobilization of the resources of positive medicine to safeguard the growth of the human infant. The safeguards will be more comprehensive; they will be clinical; they will be individualized. They will be applied to all types of children, normal as well as the defective and deviant.

J. A. S.

Secondary or Post-operative Parotitis: By Madding, F. G., and Fricke, R. E., *Surgery* **11**: 45, January, 1942.

Numerous theories have been advanced concerning the etiology of this condition. The consensus today is that the theory of ascending infection is the one most tenable (Berndt, Buck, Buxton).

Onset of secondary parotitis usually occurs during the first to the fifth day postoperatively, but may occur at any time.

The present study is based on the observation of 190 cases; 81 were treated conservatively and 109 were given radiation therapy. The condition was associated most frequently with operations involving the colon, pelvis, biliary tract, and stomach in the order given. In only one case was death directly attributable to the parotitis.

Proper oral hygiene is of paramount importance prophylactically. Conservative treatment consists of hot and cold applications and diathermy by the air-space method. Diathermy by this method consists of placing the unit 1 to 2 cm. from the involved gland. Radiation therapy reduced morbidity of this complication. Surgical drainage is indicated only in the presence of suppuration.

Harry A. Salzmann, M.D.

Blood Studies During Anesthesia: By J. D. Martin, Jr., and Roy Robertson. *Surgery* **11**: 11-18, January, 1942.

Various phenomena associated with convulsive seizures during anesthesia have been noted. Among these are: overdosage of the anesthetic, encephalopathy with nitrous oxide, impurities in the anesthetic agent, acute toxemia with associated hyperpyrexia, ether diathesis, excessive carbon dioxide, anoxia, overdosage of atropine, etc. Although these convulsions may occur in the absence of infection and during anesthesias of short duration, the majority have been associated with severe infections. In many instances the convulsive seizures were controlled by the intravenous administration of a calcium salt.

Suspecting that convulsions occurring during anesthesia might be due to changes in the blood induced by the anesthetic, many workers, among them Fay, McAllister, Searles, Ivy have made experimental and clinical studies of this phenomenon. These studies revealed that anhydremia, from water loss or deprivation, results in concentration of the blood with an equivalent or nearly equivalent increase of its formed elements and chemical constituents. Hydremia produces a similar proportionate decrease in blood constituents.

The present study consists of examinations made upon the blood of operative patients and experimental animals during anesthesia, both in the normal state and in the presence of sepsis. Studies of the amount of available calcium and degree of dehydration and hydration of the blood were carried out.

The authors found that a lowering of the blood calcium level occurs during ether anesthesia depending upon the duration of the latter. Furthermore, acute abdominal infections cause a decrease in ionized calcium in both the operative patient and experimental animal. This change is further augmented during ether anesthesia. In no instance, either experimentally or clinically, was there noted a lowering of the calcium level to within the limits of those seen in tetany.

Harry A. Salzmann, M.D.

Editorial

Inter-American Orthodontic Meetings

The trend of things in the world today no doubt reflects in advance some of the incidents that are to happen in the world of tomorrow. One of these will be closer relation with other nations and other peoples, and their cultural attainments and contributions will attract much attention. Particularly will the Spanish language be more widely understood and spoken in the entire scope of the western hemisphere, than it is at the present time.

The spontaneous interest of the public, as manifested by voluntary classes in Spanish and Portuguese held after hours among business men and their employees, among government officials and their staffs in Washington, the Army Air Corps Spanish classes at every Air Corps station in the country, and the like, has led the way. The ground is prepared for an enormously expanded program of this sort, to include all the languages, as soon as public interest is sufficiently aroused to its ultimate importance pertaining to things yet to come.

This trend was evidenced in the attendance of twenty-eight Latin-American citizens at the March meeting of the American Association of Orthodontists held in New Orleans. At the end of the week there had been wide and interesting exchange of opinion upon the subject of orthodontics between the men from Latin-American countries and those from North America. After their departure from New Orleans, the Latin-American men then went to Washington, D. C., where Army officers at the Army Medical Center had prepared a postgraduate course in general dentistry, which consumed an additional six days of time and study.

The group next journeyed to Ann Arbor, Mich., for further postgraduate work at the modern W. K. Kellogg Foundation Institute, University of Michigan. Scholarships were provided by the W. K. Kellogg Foundation for this purpose. Part of the group remained for five weeks' study and the remainder for a nine- to twelve-week program. Special postgraduate courses were arranged for them in oral surgery, general dentistry, and orthodontics, and each member enrolled in the field of his choice. While at Ann Arbor, the group attended the state dental meeting in Detroit for three days. On May 6 and 7 all were taken to Battle Creek, Mich., to be entertained by, and to become acquainted with the activities of, the W. K. Kellogg Foundation. Plainly the group made many friends while at the University of Michigan, as they did elsewhere, and left fine impressions of Latin Americans in the minds of the faculty, students, the Kellogg Foundation, and the dental profession of Michigan. Plans are now under way for a three-month postgraduate program at the W. K. Kellogg Institute for next year for thirty Latin Americans.

The entire meeting at New Orleans and all of the subsequent gatherings were a great success, and the final result will be a highly cooperative and friendly

spirit among practically all of the Latin-American countries particularly in the field of dentistry. Friendships were made among the workers of the various countries that will, no doubt, endure through a lifetime, and in the over-all picture the Inter-American meeting of 1942 under the direction of Dr. Claude Wood and his energetic committees will go down in orthodontic history as one of the outstanding contributions for orthodontic advancement of all time and will add much to complete dental and fraternal understanding, in the future relations of all countries in the western hemisphere.

H. C. P.

Special Report

MINUTES OF THE MEETING OF THE PUBLIC RELATIONS BUREAU OF THE AMERICAN ASSOCIATION OF ORTHODONTISTS HELD AT THE COLUMBIA UNIVERSITY CLUB, MARCH 9, 1942

Those present were: Chairman Nicolai, Mr. Anderson, Doctors Young, Eby, Waugh, Riesner, Barber, Salzmann, and Hillyer.

Minutes of the meeting of Jan. 19 were read and approved as read.

Dr. Nicolai read letters from Floyd Gibbin, William Flesher and T. Wallace Sorrels, complimenting the Bureau on its activities up to the present time.

Mr. Anderson read the financial statement of March 9 which is appended to the minutes.* This was approved as read.

Dr. Nicolai advised the committee that Mr. Anderson had been made the Chairman of the Board of Directors of the National Association of Publicity Directors for the year 1942-43. The Bureau extended its congratulations to Mr. Anderson on this election to the highest office in the National Association of Publicity Directors.

Mr. Anderson advised the Bureau that it had been arranged to have individual packages containing all the reprints of the releases by the Bureau for each of the Latin-American delegates at the meeting in New Orleans. These will be distributed at the meeting.

Dr. Nicolai read letters from Dr. Robison, Dr. Clendening and Dr. Pollock commending the Bureau's work; also a letter from Dr. Broussard stating that a luncheon had been arranged for public relations at the meeting in New Orleans, as appears on the program of the meeting.

He also read a letter from Dr. Stedman criticizing the article "Faces Made Over by Dental Magic." Dr. Stedman's criticism was directed at the photography employed for the illustrations and not the article. Dr. Nicolai read a letter from Dr. Varney Barnes, Sr., criticizing this same article in toto.

It was moved by Dr. Waugh that distribution of this article be discontinued. This was seconded and passed.

The Committee considered publishing as a reprint Dr. Sorrels' paper on public relations published in the February issue of the *Journal of the American Dental Association*. It was decided to permit this to await replenishment of funds.

After a lengthy discussion it was decided that it is the recommendation of the Board of Directors of the Public Relations Bureau to the Board of Directors of the American Association of Orthodontists that due to the war and its emergencies the appropriation for the Bureau be discontinued.

After a lengthy discussion on general matters, the meeting adjourned at 10:15 P.M.

Respectfully submitted,

NORMAN L. HILLYER, Secretary.

REPORT OF COMMITTEE ON PUBLIC RELATIONS AMERICAN ASSOCIATION OF ORTHODONTISTS MARCH, 1942—NEW ORLEANS, LOUISIANA

Immediately following the 1941 annual meeting, the new Executive Committee on Public Relations started to function. Frank Nicolai was selected as chairman. On Tuesday, May 27, the subcommittee had its first meeting to plan for the coming year.

*Books and statements were taken to New Orleans and turned over to Dr. Ernst before stencil was cut. Financial statement will be sent out later.

During this period, there had been a great deal of activity. We feel certain that much progress has been made. The ground work is now laid for an intensive campaign within the respective territory of each sectional society.

Our policy has been to direct educational material to those engaged in health work. Aid has been extended on numerous occasions to individuals, groups and institutions who are performing the work of instructing and talking to the layman.

We have maintained cordial relations with all those organizations requesting our material. Their letters express appreciation for the help we have given them.

An indication of the need for this work may be gathered by reading the list of agencies which have consulted us, and to whom our printed matter has been supplied during three years of public relations activities. This list is attached.

Considerable time and effort were spent in interviews and rewriting material which special feature writers were preparing for periodicals. Assistance was also given to members appearing before dental societies.

Personal attention and unstinting cooperation were extended to those responsible for the orthodontic section of a booklet under preparation by the Metropolitan Life Insurance Company. This will be read by millions of people.

In passing, only a few high points will be mentioned here. *Dental Digest* for August, 1941, said editorially, "The American Association of Orthodontists has done a fine job in public relations and public education."

"Facts about Orthodontics for Health Workers" was reprinted in the September, 1941, issue of the *New York Journal of Dentistry*.

Material from "Facts" was used by a physician who conducts a health column for a large national syndicate, comprising several hundred newspapers.

A few complaints were registered by our members against misleading articles and advertisements on orthodontic subjects. One outstanding distortion of orthodontic knowledge appeared in newspapers throughout the country and incensed our membership from coast to coast. Action was taken before far more serious damage could be done. This matter will be brought to the attention of the Board of Directors at the meeting in New Orleans for such action as they feel is wise and expedient.

The following reprints have been published in the year last past: "The General Health Benefits of Orthodontic Treatment," by Dr. James David McCoy (10,000 copies); "Crooked Teeth," by Dr. Benno E. Lischer (10,000 copies); "Faces Made Over by Dental Magic," by Wainwright Evans (5,000 copies). Of these, some of which were not issued until late in the season, the following remain on hand as of Feb. 1:

The General Health Benefits of Orthodontic Treatment—8,000 copies
Crooked Teeth—8,000 copies
Faces Made Over by Dental Magic—4,000

Previously, we have published several leaflets. There follows a list of this material, with number published, and quantity remaining on hand as of Feb. 1, 1942.

"Facts about Orthodontics for Health Workers"—100,000 printed—40,000 on hand
"Getting Ready to Tackle Life"—108,000 printed—35,020 on hand

It will be seen from the foregoing that we have on hand a stock of printed matter of wide variety, and to suit every purpose.

It is requested that this report be read in connection with Mr. Anderson's preliminary report which appeared in the JOURNAL for December, 1941.

In this report Mr. Anderson indicated that so far our Public Relations work has been extensive, widely distributed from a central point, and that now is the time for efforts to be started to make our work intensive, local orthodontists contacting local facilities for distributing information. I wish to incorporate that report here and to ask that it be read at the same time as this report.

The plan of the Committee for the forthcoming year would call for the personal assistance of Mr. Anderson in visiting various sectional societies, working to integrate the use of our educational material into the official and voluntary health set-up existing in each locality.

Letters from several sectional societies indicate a willingness to become more active locally in educational work, but a backwardness about getting into action. Fear of violating ethical standards has deterred many members. Mr. Anderson's long association with the National Tuberculosis Association, and laterly with the Medical Society of the State of New York, gives him experience along these lines that will provide material help in getting the most out of the excellent educational material we have accumulated in the three years the committee has been functioning.

In closing may I be permitted to remind you that the health of the child is the power of the nation and that any effort, time, or money now expended is a patriotic gesture and will bring reward in years to come. A properly informed public is most essential in times when so many worldwide changes are taking place and all professions are being subjected to criticism and rigorous re-examination.

The official Public Relations Committee desires to thank the members of the Board of Directors for the hard and faithful work they have done. They are: Glenn F. Young, Norman L. Hillyer, Henry U. Barber, Jr., Joseph D. Eby, Sidney E. Riesner, J. A. Salzmann, and Leuman M. Waugh. Our thanks are due to the officers of the society and the editor of the JOURNAL for their cooperation. I also wish to express my appreciation of the efforts of our director, Mr. Anderson, for his careful guidance and expert performance of all his duties.

This committee is charged in the By-Laws with the duty of reporting on socio-economic and legislative matters. As to these, the Committee observes no matters needing to be brought to the attention of the membership at this time, in view of rapidly changing conditions, which might upset any calculation between the time of writing this report and the time of the meeting.

We recommend that the Bureau of Public Relations be continued with an appropriation of not less than $2,500 for the next year and that another three-year program be authorized for this most important work.

FRANK NICOLAI,
Chairman, Executive Committee,
GEORGE A. BARKER,
HOMER ROBISON

Feb. 3, 1942.

LIST OF ORGANIZATIONS TO WHOM SERVICE HAS BEEN RENDERED BY PUBLIC RELATIONS BUREAU, A.A.O., IN THE THREE YEARS ENDING FEB. 1, 1942

Akron, Ohio
Akron Dental Society
Akron Public Health Dept.
Albany, N. Y.
Dept. of Health
Alexandria, La.
Rapides Parish Health Unit
Amsterdam, N. Y.
City Health Dept.
Annapolis, Md.
County Health Dept.
Ann Arbor, Mich.
State Board of Health
Ardmore, Pa.
County Health Assn.
Ashland, Wis.
Dept. of Health
Atlanta, Ga.
Dept. of Health
Austin, Texas
State Board of Health
Ayer, Mass.
Nashoba Board of Health

Bakersfield, Calif.
County of Kern Health Dept.
Blountville, Tenn.
County Health Dept.
Boise, Idaho
Division of Public Health
Boston, Mass.
Community Health Assn.
Brooklyn, N. Y.
Dept. of Public Health
N. Y. C. Board of Education

Camden, N. J.
Dept. of Public Health
Central Islip, N. Y.
Health Dept.

Charleston, W. Va.
Dept. of Health
Chattanooga, Tenn.
P.T.A.
Chicago, Ill.
Chicago Dental Assn.
Nurse Placement Bureau
Clarksdale, Miss.
County Health Dept.
Cleveland, Ohio
Western Reserve University
School of Nursing
Coldwater, Kan.
County Public Health Service
Columbia, S. C.
State Board of Health
Columbus, Ohio
Public Health Assn.
State Nurses' Assn.
Corpus Christi, Texas
American Red Cross
Corvallis, Ore.
City Health Dept.
State College

Delaware, Ohio
Ohio Wesleyan
Denton, Texas
State College for Women
Denver, Colo.
Colorado State Medical Society
Division of Public Health
Public Schools
Des Moines, Iowa
State Dept. of Health
Duluth, Minn.
Board of Health
Durham, N. C.
Dept. of Health

East Lansing, Mich.
Michigan State College
East Orange, N. J.
E. O. Health Dept.
Edna, Texas
Public Health Dept.
Elkhorn, Wis.
Board of Health
Erie, Pa.
County Tuberculosis Assn.
Eugene, Ore.
Health Dept.

Fall River, Mass.
District Nursing Assn.
Fort Worth, Texas
Dept. of Public Health

Galveston, Texas
Public Health Nursing Service
Gary, Ind.
County Tuberculosis Assn.
Geneva, N. Y.
Dept. of Health.
Glens Falls, N. Y.
Dept. of Health
Grants Pass, Ore.
County Dept. of Health
Greensboro, N. C.
University of N. C.

Hamilton, Ohio
County Health Assn.
Harrisburg, Pa.
Dept. of Health
Heflin, Ala.
Health Dept.
Helena, Mont.
Dept. of Health
Holyoke, Mass.
Visiting Nurse Assn.
Honolulu, Hawaii
Board of Health
Houston, Texas
Dental College
Huntington Park, Calif.
Dept. of Health
Hyattsville, Md.
County Health Dept.

Indianapolis, Ind.
State Board of Health
Iowa City, Iowa
State University
Ithaca, N. Y.
Cornell University

Jackson, Miss.
Board of Health

Knoxville, Tenn.
Bureau of Health

La Junta, Colo.
City Health Dept.
Lansing, Mich.
Michigan Tuberculosis Assn.
Lexington, Miss.
City Dept. of Health
Lincoln, Neb.
City Dept. of Health
State Dept. of Health
Los Angeles, Calif.
County Health Dept.
Southern Calif. State Dental Assn.

Louisville, Ky.
Community Chest
State Dept. of Health
Lynn, Mass.
Dept. of Public Health

Marion, Ark.
State Board of Health
Mason, Mich.
Ingham County Health Dept.
Mason City, Ill.
Home Bureau
Macomb, Ill.
Dept. of Agriculture
Meadville, Pa.
County Tuberculosis Assn.
Melrose, Mass.
Board of Health
Memphis, Tenn.
Shelby County Health Dept.
Mexico City, Mexico
Mexican Ortho. Society
Mineola, N. Y.
Nassau County Tuberculosis Assn.
Mobile, Ala.
Board of Health

Nashville, Tenn.
Dept. of Public Health
Newark, N. J.
Essex County Tuberculosis Assn.
Newbury, Mich.
District Dept. of Health
New Haven, Conn.
Dept. of Health
New London, Conn.
Dept. of Public Health
New York City
Dept. of Health
Tuberculosis and Public Health Assn.
Nutley, N. J.
American Red Cross

Oak Park, Ill.
Dept. of Health
Public Schools
Ogden, Utah
Health Dept.
Oklahoma City, Okla.
State Health Dept.
Olean, N. Y.
American Red Cross
County Health Dept.
Omaha, Neb.
Tuberculosis Assn.
Oregon City, Ore.
Health Dept.
Oshawa, Ontario
Public Health Dept.

Palo Alto, Calif.
Board of Education
Peoria, Ill.
Dept. of Health
Philadelphia, Pa.
County Health Assn.
University of Pennsylvania
Pierre, S. D.
State Board of Health
Pine Grove, W. Va.
West Va. Dental Journal
Pontiac, Mich.
Visiting Nurse Assn.
Portland, Ore.
Board of Health
Poteau, Okla.
Laflore County Health Unit
Providence, R. I.
Visiting Nurse Assn.
Y. W. C. A.

Quincy, Fla.
County Health Dept.
Quinter, Kan.
State Board of Health

Richmond, Va.
Dept. of Public Schools
Rochester, N. Y.
Visiting Nurse Assn.

Sacramento, Calif.
Dept. of Public Health
Saint Louis, Mo.
Missouri Tuberculosis Assn.
Salisbury, Md.
City Dept. of Health
Salt Lake City, Utah
Dept. of Health
San Antonio, Texas
City Dept. of Health
San Diego, Calif.
Health Dept.
San Francisco, Calif.
City Department of Public Health
San Jose, Calif.
State College
San Leandro, Calif.
Alameda County Health Unit
San Luis Obispo, Calif.
Dept. of Health

Santa Ana, Calif.
County Dept. of Health
Santa Barbara, Calif.
Health Dept.
Santa Cruz, Calif.
County Health Dept.
Seattle, Wash.
Tuberculosis League
University of Washington
Springfield, Ill.
Dept. of Health
Susanville, Calif.
Jr. College and High School
Syracuse, N. Y.
Onondaga County Health Assn.
Syracuse University

Tacoma, Wash.
County Health Dept.
Toledo, Ohio
Board of Education
Toms River, N. Y.
Health Dept.
Toronto, Ont.
Dental Hygiene Committee
Ontario Dental Assn.
Trenton, N. J.
Public Health and Welfare Dept.
Tucson, Ariz.
University of Arizona

Washington, D. C.
American Home Economics Assn.
Children's Bureau
Council of Social Agencies
Health Dept.
Social Security Board
White Plains, N. Y.
County of Westchester Health Dept.
Wilkes-Barre, Pa.
Visiting Nurse Assn.
Winnsboro, La.
Health Unit

Youngstown, Ohio
County Health District

LIST OF PLACES WHERE SERVICE HAS BEEN RENDERED TO INDIVIDUALS IN FOLLOWING CLASSIFICATIONS*

Dental Assistants
Dental Clinics
Dental Hygienists
Dieticians
Education Departments
Home Nursing
Hospitals
Pediatricians
Public Health Nurses
Red Cross Nurses
Schools

Addison, N. Y.—3
Akron, Ohio—3
Albany, N. Y.—3
Allentown, Pa.—1
Alliance, Neb.—1
Amarillo, Texas—2
Anchorage, Alaska—1
Ann Arbor, Mich.—6
Arcata, Calif.—1
Arkadelphia, Ark.—1
Arlington, Va.—1
Asbury Park, N. J.—1
Asheville, N. C.—2
Astoria, N. Y.—2
Athens, Ala.—1
Athol, Mass.—1
Atlanta, Ga.—4
Auburn, Maine—1
Auburn, N. J.—1
Augusta, Ga.—1
Augusta, Maine—2

Babylon, N. Y.—2
Baker, Ore.—1
Baltimore, Md.—2
Barre, Ontario—1
Batavia, N. Y.—1
Baton Rouge, La.—1
Bayonne, N. J.—1
Belleville, Tex.—1
Beloit, Wis.—4
Bessemer, Ala.—1

*Figure following name of place indicates number of individuals to whom a service was rendered.

Binghamton, N. Y.—2
Birmingham, Ala.—1
Bloomington, Ill.—1
Boston, Mass.—12
Brattleboro, Vt.—1
Brenham, Texas—1
Brent, Ala.—1
Bridgeport, Conn.—1
Bronxville, N. Y.—1
Brookline, Mass—2
Brooklyn, N. Y.—43
Browning, Mont.—1
Brownsville, Vt.—1
Buffalo, N. Y.—13
Burlington, Iowa—1
Burlington, Vt.—3
Burns, Ore.—1

Caibarien, Cuba—1
Calais, Maine—1
Calcutta, India—1
Calgary, Alberta—1
Canton, Mo.—1
Carlisle, Pa.—1
Casper, Wyo.—1
Castle Shannon, Pa.—2
Cassopolis, Mich.—2
Cedarhurst, N. Y.—2
Centerville, Iowa—1
Chappaqua, N. Y.—1
Charleston, W. Va.—6
Charlotte, N. C.—2
Chattanooga, Tenn.—6
Chatham, Ontario—1
Chelsea, Mass.—2
Chicago, Ill.—23
Cicero, Ill.—1
Cincinnati, Ohio—1
City of St. Catharine—1
Claremont, Calif.—2
Clayton, Mo.—1
Cleveland, Ohio—18
Clinton, Iowa—1
Coachella, Calif.—1
Colby, Kan.—1
Colfax, Wash.—1
Columbia, S. C.—2
Columbus, Ohio—3
Concordia, Kan.—1
Coney Island, N. Y.—1
Conway, S. Car.—1
Coral Gables, Fla.—1
Corvallis, Ore.—6
Crandon, Wis.—1
Cullman, Ala.—1

Dallas, Ore.—1
Dallas, Tex.—5
Danville, Pa.—2
Danville, Va.—1
Dayton, Ore.—1
Dennison, Iowa—1
Denver, Colo.—5
Des Moines, Iowa—3
Detroit, Mich.—1
Dexter, Mo.—1
Dorchester, Mass.—2
Dover, Del.—6
Dubuque, Iowa—1
Duluth, Minn.—1
Dunedin, N. Z.—1

East Orange, N. J.—4
Eggertsville, N. Y.—1
Elgin, Ill.—1
Elizabeth, N. J.—3
Elizabethtown, Tenn.—1
El Paso, Tex.—1
Ellinwood, Kan.—2
Elkin Park, Pa.—1
Englewood, N. J.—1
Erie, Pa.—4
Eureka, Calif.—1
Evanston, Ill.—2

Fall River Mass.—2
Fargo, N. D.—2
Faribault, Minn.—1
Fillmore, Utah—1
Findlay, Ohio—2
Fishers Island, N. Y.—1
Fitchburg, Mass.—1
Flint, Mich.—3
Floral Park, N. Y.—1
Flushing, N. Y.—1
Fond du Lac, Wis.—2
Forest Hills, N. Y.—1
Fort Bragg, Calif.—1
Franklin, La.—1
Franklin, Tenn.—1
Fresno, Calif.—2

Geneva, Ohio—1
Glendale, Calif.—7
Glens Falls, N. Y.—1
Glen Ridge, N. J.—1
Grand Haven, Mich.—1
Grand Island, Neb.—5
Grand Rapids, Mich.—2
Granite City, Ill.—1
Great Neck, N. Y.—3
Greeley, Calif.—1
Green Bay, Wis.—1

Greenfield, Mass.—3
Greenwich, Conn.—1
Grundy Center, Iowa—1

Hackensack, N. J.—3
Hampton, N. H.—1
Harrisburg, Pa.—1
Hartford, Conn.—4
Havre, Mont.—1
Hempstead, N. Y.—3
Herndon, Va.—1
Heron Lake, Minn.—1
Hollywood, Calif.—4
Holyoke, Mass.—2
Honolulu, Hawaii—2
Houston, Tex.—2
Howe, Ind.—1
Hugo, Colo.—1
Hutchinson, Kan.—3

Indianapolis, Ind.—1
Indiana, Pa.—1
Iowa City, Iowa—1

Jackson Heights, N. Y.—1
Jacksonville, Fla.—2
Jacksonville, Ill.—1
Jamaica, N. Y.—6
Jefferson City, Mo.—4
Jenkintown, Pa.—1
Jersey City, N. J.—3
Jerseyville, Ill.—1
Johnstown, Pa.—1
Jonesboro, Tenn.—2
Juneau, Alaska—1

Kansas City, Kan.—6
Kansas City, Mo.—5
Kearney, N. J.—2
Keewatin, Minn.—1
Kent, Ohio—1
Kenville, Minn.—1
Kingston, N. Y.—1
Knoxville, Tenn.—1

Lancaster, Pa.—2
Lansing, Mich.—3
La Porte, Ind.—1
La Salle, Ill.—1
Lewiston, Maine—1
Lexington, Ky.—4
Liberty, Mo.—1
Lincoln, Neb.—1
Litchfield, Minn.—1
London, England—2
Long Beach, Calif.—2
Long Branch, N. J.—1
Long Island City, N. Y.—1
Los Angeles, Calif.—15
Lubbock, Tex.—1

Madison, Wis.—4
Malden, Mass.—1
Manasquan, N. J.—1
Maquoketa, Iowa—1
Marion, Ark.—2
Marshalltown, Iowa—1
McComb, Miss.—1
McKinney, Texas—1
McRae, Ga.—1
Memphis, Tenn.—4
Miami, Fla.—1
Michigan City, Ind.—1
Midvale, Utah—2
Milburn, N. J.—1
Milford, Mass.—1
Milwaukee, Wis.—4
Minneapolis, Minn.—2
Mission, Tex.—1
Missoula, Mont.—1
Mobile, Ala.—1
Modesto, Calif.—1
Montgomery, Ala.—1
Montreal, Quebec—1
Morgantown, Ky.—1
Moscow, Idaho—1
Mount Vernon, N. Y.—2

Napa, Calif.—3
Nashville, Tenn.—2
Negri Sembilan, Malaya—1
Nevada, Mo.—1
Newark, N. J.—8
New Britain, Conn.—3
New Haven, Conn.—3
New Holstein, Wis.—1
New Martinsville, W. Va.—1
New Orleans, La.—1
Newport, Wash.—1
New Rochelle, N. Y.—2
Newton Center, Mass.—1
Newton Falls, Ohio—1
Newtonville, Mass.—1
New York City—92
Nopeming, Minn.—1
Norman, Okla.—1
Northampton, Mass.—1
Nutley, N. J.—1

Oakland, Calif.—2
Oak Park, Ill.—1
Oberlin, Ohio—1
Oklahoma City, Okla.—7
Olean, N. Y.—1

Olney, Texas—1
Oneida, N. Y.—1
Oneonta, N. Y.—1
Ootsburg, Wis.—1
Orlando, Fla.—3
Oshkosh, Wis.—2
Oscaloosa, Iowa—1
Ottawa, Ontario—1
Ottumwa, Iowa—1
Owosso, Mich.—1

Palo Alto, Calif.—4
Palo Leyte, P. I.—1
Panama, N. Y.—1
Paris, Texas—1
Pasadena, Calif.—4
Passaic, N. J.—1
Patchogue, N. Y.—1
Paxton, Ill.—1
Peekskill, N. Y.—1
Pensacola, Fla.—1
Peoria, Ill.—4
Perth Amboy, N. J.—2
Petersburg, Va.—1
Philadelphia, Pa.—26
Pittsburgh, Pa.—10
Pomona, N. Y.—1
Pontiac, Ill.—1
Portage, Wis.—1
Portales, N. Mex.—1
Portland, Maine—1
Portland, Ore.—7
Pottsville, Pa.—1
Poughkeepsie, N. Y.—3
Princeton, Ky.—1
Providence, R. I.—1
Pulaski, Tenn.—1

Racine, Wis.—1
Raleigh, N. C.—1
Rapid City, S. D.—1
Reading, Pa.—1
Red Bank, N. J.—1
Redwood City, Calif.—1
Redwood Falls, Minn.—1
Reidsville, N. C.—1
Reno, Nev.—1
Revere, Mass.—1
Rexford, N. Y.—1
Richmond, Va.—1
Richmond Hill, N. Y.—1
Rochester, N. Y.—11
Rockford, N. Y.—1
Romney, W. Va.—1
Roseburg, Ore.—1
Rumford, Maine—1
Rocky Mountain, N. C.—1

Salamanca, N. Y.—1
Salem, Ore.—3
Salinas, Calif.—1
St. Joseph, Mo.—1
St. Louis, Mo.—20
St. Paul, Minn.—6
St. Peter, Minn.—1
St. Petersburg, Fla.—1
Salt Lake City, Utah—1
San Antonio, Tex.—1
San Fernando, Calif.—1
San Francisco, Calif.—15
San Jose, Calif.—6
Santa Cruz, Calif.—2
Santa Monica, Calif.—2
Schenectady, N. Y.—1
Scranton, Pa.—4
Seattle, Wash.—5
Shelbyville, Ill.—1
Shreveport, La.—5
Sonyea, N. Y.—1
Southampton, N. Y.—1
South Bend, Ind.—3
South Norwalk, Conn.—2
South Orange, N. J.—1
Spartanburg, S. C.—1
Spokane, Wash.—1
Springfield, Ill.—1
Springfield, Mass.—2
Springfield, Mo.—1
Stamford, Conn.—1
Stanford University, Calif.—1
Stony Creek, Va.—1
Summit, N. J.—2
Syracuse, N. Y.—1

Tacoma, Wash.—2
Tampa, Fla.—1
Teaneck, N. J.—2
Terre Haute, Ind.—1
Texarkana, Texas—1
Thomaston, Conn.—1
Tillamook, Ore.—1
Toledo, Ohio—3
Tonapah, Nev.—1
Topeka, Kan.—1
Toronto, Canada—9
Traverse City, Mich.—1
Trenton, N. J.—3
Tulsa, Okla.—2

Ulysses, Kan.—3
Union City, N. J.—1
Urbana, Ill.—3

Vallejo, Calif.—1

Waco, Texas—10
Walla Walla, Wash.—2
Waltham, Mass.—1
Warren, Ohio—1
Warrensburg, Mo.—1
Warrentown, Va.—1
Washington, D. C.—7
Washington, Pa.—1
Waterloo, Iowa—1
Wausau, Wis.—4
Waverly, Iowa—1
Wharton, Texas—1
White Plains, N. Y.—2
Whitesboro, N. Y.—1
Wichita, Kan.—3
Wichita Falls, Texas—3
Wilkes-Barre, Pa.—1
Wilmington, Del.—1
Winchester, Va.—2
Windsor, Ontario—1
Winfield, Kan.—1
Winnepeg, Canada—1
Winthrop, Mass.—2
Woodstock, Va.—2
Woodworth, Wis.—1
Wooster, Ohio—1
Worcester, Mass.—5
Wytheville, Va.—1
Yakima, Wash.—1
Yonkers, N. Y.—2
York, Pa.—1
Youngstown, Ohio—4

REPORT OF NET FROM SALES OF PRINTED MATTER
PUBLIC RELATIONS BUREAU

AMERICAN ASSOCIATION OF ORTHODONTISTS
MAY 1, 1939—MARCH 1, 1942

"Make Way for Even Teeth"—Distributed October, 1939

50,000 copies printed @	$116.04
47,875 copies sold	266.00
2,125 free distribution	
	$149.96 Surplus

"School Hours and Professional Service for School Children"—Distributed February, 1940

1,000 copies printed @	$18.47
360 copies sold	10.50
640 free distribution	
	$ 7.97 Deficit

"Facts About Orthodontics for Health Workers"—Published February, 1940

100,000 copies printed @	$397.80
45,579 copies sold	416.00
14,130 free distribution	
40,291 copies on hand	
	$ 18.20 Surplus

"Getting Ready to Tackle Life"—Published December, 1940

108,000 copies printed @	$558.45
52,467 copies sold	510.55
45,615 copies on hand	
9,918 free distribution	
	$ 47.90 Deficit

"General Health Benefits of Orthodontic Treatment"—Distributed November, 1941

10,000 copies printed @	$191.05
865 copies sold	59.75
1,035 free distribution	
8,100 copies on hand	
	$131.30 Deficit

"Crooked Teeth—Don't Let Them Spoil Your Child's Good Looks"—Distributed January, 1942

10,000 copies printed @	$30.50	
2,250 copies sold	26.00	
700 free distribution		
7,050 copies on hand		
	$ 4.50	Deficit

"Faces Made Over by Dental Magic"—Distributed January, 1942

5,000 copies printed @	$90.00	
950 copies sold	12.50	
1,650 free distribution		
3,350 copies on hand		
	$77.50	Deficit

Summary

Total Surplus	$168.16
Total Deficit	269.17
Net Deficit (Which will be Absorbed by Future Orders)	$101.01

News and Notes

American Board of Orthodontics

The American Board of Orthodontics has elected the following officers for 1942: President, William E. Flesher, Oklahoma City, Okla.; Vice-President, Frederic T. Murlless, Jr., Hartford, Conn.; Secretary, Bernard G. deVries, Minneapolis, Minn.; Treasurer, Oliver W. White, Detroit, Mich. Other Board members are James D. McCoy, Los Angeles, Calif.; Joseph D. Eby, New York, N. Y.; and Claude R. Wood, Knoxville, Tenn.

Army Dental Corps Announcement

Under date of May 5, 1942, information has been received by the AMERICAN JOURNAL OF ORTHODONTICS AND ORAL SURGERY to the effect that appointments in the Dental Corps, Army of the United States, are open to qualified dentists not over 37 years of age and to all those who have been placed in Class 1A by their local induction boards.

Upon request, application blanks will be furnished to all those who fall into either of these categories by the Dental Service, Office of the Surgeon General, Washington, D. C.

A. D. A. Meeting

Realizing the importance of personal contact between dentists and Selective Service, Selective Service is presenting an exhibit in the Scientific and Health Exhibits section at Boston next August. Informed Selective Service personnel will graphically explain the newer methods employed by their department and will answer all questions on the subject asked by A. D. A. members.

The visual education portion of the exhibits will be strikingly new, as effects are produced in full color pictures supported by use of animated cartoons and many of amateur cinemaland's and Hollywood's best methods. The new motion pictures which have been produced by dentists show the latest developments of dental technique and science.

The Scientific and Health Exhibits, including motion pictures, will be held in Mechanics Hall at the Annual Meeting of the American Dental Association in Boston, Aug. 24 to 28, 1942.

Note of Interest

Dr. James David McCoy and Dr. John Rush McCoy, 3839 Wilshire Blvd., Los Angeles, announce the opening of an additional office at 9629 Brighton Way, Corner Bedford Drive, Beverly Hills, Calif. Practice limited to orthodontics.

OFFICERS OF ORTHODONTIC SOCIETIES*

American Association of Orthodontists

President, J. A. Burrill - - - - - - - - - - - 25 East Washington St., Chicago, Ill.
Secretary-Treasurer, Max E. Ernst - - - 1250 Lowry Medical Arts Bldg., St. Paul, Minn.
Public Relations Bureau Director, Dwight Anderson
- - - - - - - - - - - - - - - - - - 292 Madison Ave., New York, N. Y.

Central Association of Orthodontists

President, Harold J. Noyes - - - - - - - - - 55 E. Washington St., Chicago, Ill.
Secretary-Treasurer, L. B. Higley - - - - - - - 705 Summit Ave., Iowa City, Iowa

Great Lakes Society of Orthodontists

President, Henry D. Cossitt - - - - - - - - - - 942 Nicholas Bldg., Toledo, Ohio
Secretary-Treasurer, C. Edward Martinek - - - - - 661 Fisher Bldg., Detroit, Mich.

New York Society of Orthodontists

President, E. Santley Butler - - - - - - - - 55 Locust Ave., New Rochelle, N. Y.
Secretary-Treasurer, Norman L. Hillyer - - - - Professional Bldg., Hempstead, N. Y.

Pacific Coast Society of Orthodontists

President, Ben L. Reese - - - - - - - - - - - Roosevelt Bldg., Los Angeles, Calif.
Secretary-Treasurer, Earl F. Lussier - - - - - 450 Sutter St., San Francisco, Calif.

Rocky Mountain Society of Orthodontists

President, George H. Siersma - - - - - - - - - 1232 Republic Bldg., Denver, Colo.
Secretary-Treasurer, Curtis L. Benight - - - - - - 1001 Republic Bldg., Denver, Colo.

Southern Society of Orthodontists

President, W. P. Wood, Jr. - - - - - - - - - - 442 W. Lafayette St., Tampa, Fla.
Secretary-Treasurer, E. C. Lunsford - - - - - - 2742 Biscayne Blvd., Miami, Fla.

Southwestern Society of Orthodontists

President, E. Forris Woodring - - - - - - - - - Medical Arts Bldg., Tulsa, Okla.
Secretary-Treasurer, R. E. Olson - - - - - - Union Nat'l Bank Bldg., Wichita, Kan.

American Board of Orthodontics

President, William E. Flesher - - - - - - 806 Medical Arts Bldg., Oklahoma City, Okla.
Vice-President, Frederic T. Murlless, Jr. - - - - - 43 Farmington Ave., Hartford, Conn.
Secretary, Bernard G. deVries - - - - - - - - Medical Arts Bldg., Minneapolis, Minn.
Treasurer, Oliver W. White - - - - - - - - 213 David Whitney Bldg., Detroit, Mich.
James D. McCoy - - - - - - - - 3839 Wilshire Blvd., Los Angeles, Calif.
Joseph D. Eby - - - - - - - - - - 121 E. 60th St., New York, N. Y.
Claude R. Wood - - - - - - - - - Medical Arts Bldg., Knoxville, Tenn.

Harvard Society of Orthodontists

President, Harold J. Nice - - - - - - - - - 475 Commonwealth Ave., Boston, Mass.
Secretary-Treasurer, Edward I. Silver - - - - - - - - 80 Boylston St., Boston, Mass.

Washington-Baltimore Society of Orthodontists

President, Paul W. Hoffman - - - - - - - - 1835 Eye St., N. W., Washington, D. C.
Secretary-Treasurer, Stephen C. Hopkins - - - - - 1726 Eye St., Washington, D. C.

Foreign Societies†

British Society for the Study of Orthodontics

President, S. A. Riddett
Secretary, R. Cutler
Treasurer, Harold Chapman

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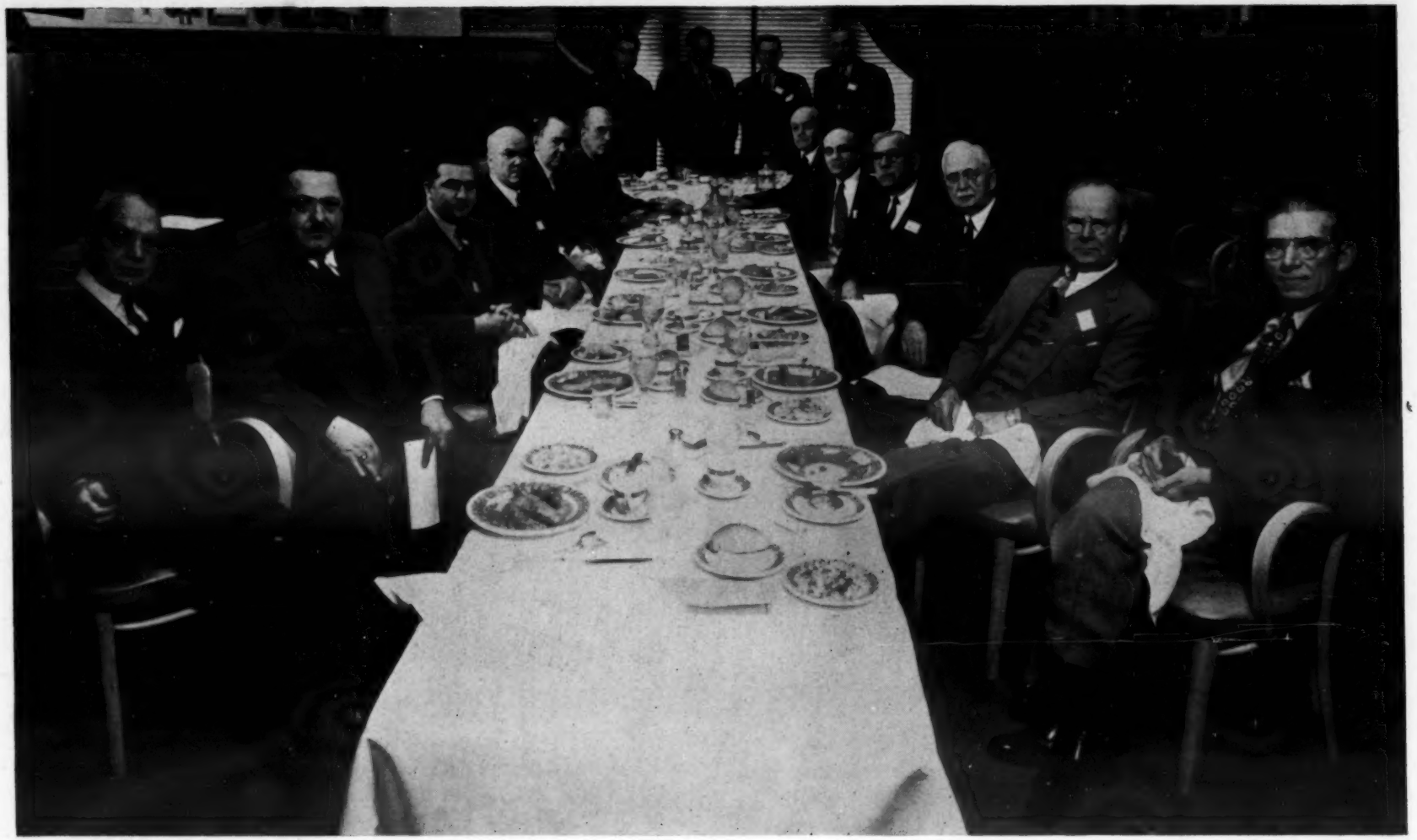
*The Journal will make changes or additions to the above list when notified by the secretary-treasurer of the various societies. In the event societies desire more complete publication of the names of officers, this will be done upon receipt of the names from the secretary-treasurer.

†The Journal will publish the names of the president and secretary-treasurer of foreign orthodontic societies if the information is sent direct to the editor, 8022 Forsythe, St. Louis, Mo., U. S. A.

UNIV. OF MICH.



At the Past-President's luncheon, A. A. O. meeting in New Orleans, March, 1942.

Sitting, left to right: H. C. Pollock, Harry Allshouse, Claude R. Wood, James D. McCoy, C. C. Howard, Joseph D. Eby, Oliver W. White, Charles R. Baker, Harry E. Kelsey, John Mershon, Ralph Waldron, and Paul G. Spencer.

Standing in back from left to right: Brigadier General Leigh C. Fairbank, Oren A. Oliver, Henry U. Barber, and William A. Murray.